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HORTICULTURAL

THE AGRICULTURAL STUDENT



HORTICULTURAL NUMBER

MARCH 1914

15 CENTS

\$1⁰⁰ THE YEAR

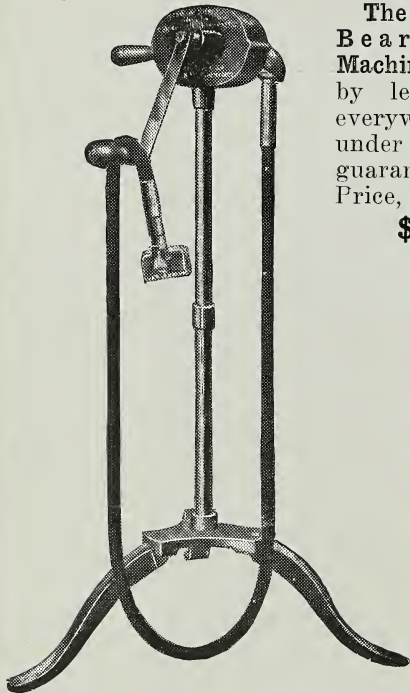
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The Stewart Ball Bearing Clipping Machine is for sale by leading dealers everywhere. Sold under a positive guarantee to please. Price,

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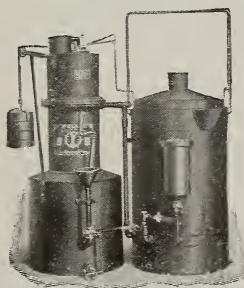
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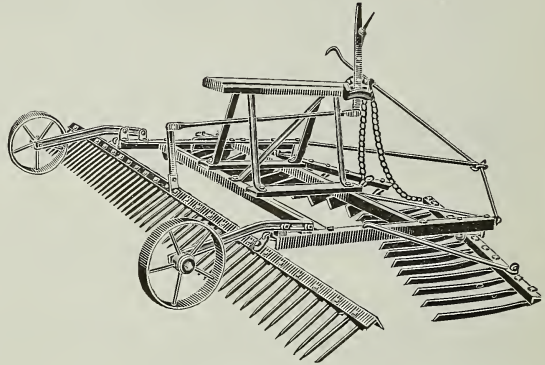
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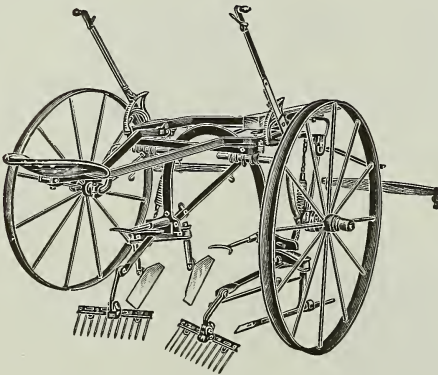
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Intensive Farming

It thoroughly prepares a level seed bed at a minimum cost of labor, leaving an ideal mulch with all weeds eradicated.



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is not only thorough in its method of cultivating, but is a weed exterminator and leaves the much desired mulch two to three inches deep, thus furnishing double protection by not destroying the corn roots and supplying a covering of fine dirt to retain the moisture. Good for all cultivations in all fields at all times by all corn raisers. All users of TOWER tools become enthusiasts. Look for the name "TOWER" when you buy.

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Dairyman's
Cleaner and Cleanser

In Every Package. So thorough are the cleaning properties of this unusual washing agent that it cleans far beyond what the eye can see, removing thousands, yes millions, of bacteria, the deadly destroyers of milk and butter quality. It is because of this extra cleaning, doing what other washing agents cannot do, that has given Wyandotte Dairyman's Cleaner and Cleanser the unanimous support of Dairy Colleges and Scientific Dairy Experts.

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Ask your dealer for "Wyandotte" or write your dairy supply house.

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Feed Your Crops Available Potash

Insoluble plant foods are cheap in the beginning but may be dear in the end. We feel good when we hear that the soil contains enough Potash to raise 5000 crops, but we feel tired when we discover that it will take 1000 years or so to make it available. We will be converted into plant food ourselves long before that.

POTASH

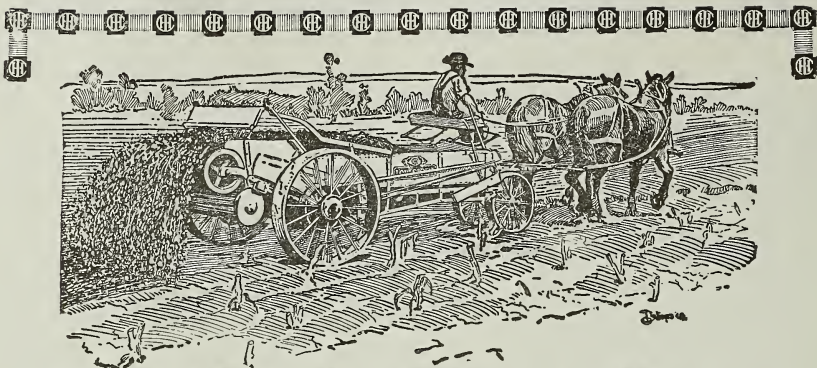
The acids derived from green manure may make insoluble phosphate of lime more available. But the feldspathic Potash in the soil is less soluble in these acids than in the slightly alkaline waters of the best soils. A little soil Potash becomes available yearly, but not enough to provide for profitable crops. Crops have two periods of Potash hunger. One just after germination and the other when starch formation is most rapid—when the grain is filling. Rational fertilization requires ample available Potash at these periods and if you provide it you will find that **Potash Pays.** Send for our pamphlet on making fertilizers.

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Best-Hated of Farm Tasks

ON the spreaderless farm the thought of the great heaps of manure piling up constantly in barn yards, stables, and stalls, is a gloomy one. Those piles mean much disagreeable and hard work. Three times every bit must be handled. It must all be loaded onto high wagons. It must be raked off in piles in the fields. Then every forkful must be shaken apart and spread.

Compare that old-fashioned method with the spreader way. You pitch the manure into the spreader box, only waist high, drive out and — the machine does all the rest.

And, far more important, if you buy an I H C spreader one ton of manure will go as far as two tons spread by hand, with the same good effect on the soil, and it will all be spread evenly.

I H C Manure Spreaders

are farm necessities. The man who uses one will get the price of it back in increased crops before its newness has worn off.

I H C spreaders are constructed according to plans in which every detail, every feature, is made to count. They are built to do best work under all circumstances, and to stand every strain for years. They are made in all styles and sizes, for small farms and large, low and high machines, frames of braced and trussed steel. Uphill or down, or on the level, the apron drive assures even spreading, and the covering of corners is assured by rear axle differentials. In all styles the rear axle is placed so that it carries near three-fourths of the load. This, with the wide-rimmed wheels with Z-shaped lugs, makes for plenty of tractive power. Winding of the beater is prevented by large diameter and the beater teeth are long, strong and chisel pointed.

A thorough examination of the I H C spreader line, at the store of the local dealer who sells them, will interest you. Have him show you all these points and many more. Study the catalogues you can get from him, or, write the



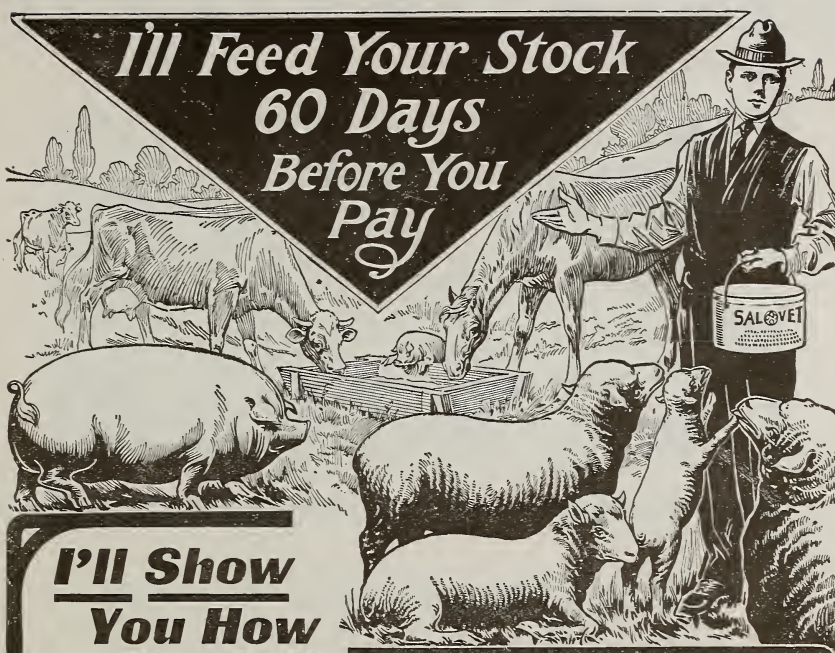
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(Incorporated)

Chicago

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**I'll Feed Your Stock
60 Days
Before You
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**I'll Show
You How**

**To make them grow faster—thrive better—look better—
Put on flesh on no more feed—stop losses from worms—**

I have done it for thousands of farmers and stockmen—I'll do it for you. All I ask is the privilege of sending you enough Sal-Vet to last your stock 60 days. I simply want to show you what a remarkable change Sal-Vet will work on your sheep, your hogs, your horses and cattle. I want to show you how it will improve their condition—rid them of all stomach and free intestinal worms which are the biggest drain on your stock profits. I don't ask a penny of pay in advance. I prove all my claims first—and if you are not satisfied at the end of 60 days, you do not pay me a cent.

**The Great
Worm Destroyer**

SALOVET

**and Stock
Conditioner**

Sal-Vet is first a worm destroyer; second, a conditioner; a medicated salt. It contains several medicinal elements which promptly kill and expel stomach and free intestinal worms and in the meantime puts the digestive organs in a healthy, vigorous condition. It sharpens the appetite—tones the blood—puts life and vitality into the whole system. It aids digestion—helps the animal to derive more good from its feed.

No Drenching—No Handling—They Doctor Themselves

It is easy to feed Sal-Vet—you feed it just as you do salt. Put it where all your stock—sheep, lambs, hogs, horses and cattle, can get at it daily and they will doctor themselves. It will keep your hogs, sheep and lambs from dying—make your horses and cattle look better, thrive better—save you money in saving feed—make you more profit by making your stock more valuable. I want to prove all this on your own farm and before you pay me one cent. You cannot afford not to accept this open, liberal offer. You pay the small freight charge when it arrives and I will send you enough Sal-Vet to feed your stock 60 days, after that you pay if pleased. Read this letter:

From Sec'y Amer. Hampshire Swine Record Ass'n.

"I write to say that I have been a free user of Sal-Vet ever since its introduction and find that it is a perfect worm exterminator. I feed Sal-Vet as I would salt and it positively does all that you claim for it. There is nothing within my knowledge as good and reliable or as cheap. It expels worms and puts stock in fine condition." E. C. STONE, Peoria, Ill.

Send No Money—Simply Send Coupon

If you could open and read the letters I get, voicing the appreciation of hundreds of stockmen and farmers—who have taken advantage of my liberal offer, you would not delay a minute in sending me the coupon requesting enough Sal-Vet to feed your stock 60 days, especially when I do it before you pay. Now fill in the coupon, telling how many head of stock you are feeding—mail at once. Sal-Vet costs but one-twelfth of a cent per day for each hog or sheep.

SIDNEY R. FEIL, President
THE S. R. FEIL CO., Dept. A33, Cleveland, O.

Prices: 40 lbs., \$2.25; 100 lbs., \$5.00; 200 lbs., \$9.00; 300 lbs., \$13.00; 500 lb., \$21.12. No orders filled for less than 40 lbs. on this 60 day trial offer.

SIDNEY R. FEIL, Pres. THE S. R. FEIL CO., Cleveland, Ohio
Can you imagine SALOVET to last my stock 60 days, I will pay the freight cost, but you pay the freight cost. If it does not, you are to cancel the trial offer, for I'll do what you claim.

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Shipping Sta. _____ State _____
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We need more cream to take
care of the increasing demand
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"DAISY BRAND" BUTTER.

Better start today and ship us
what you can spare.

"Checks Mailed for Each Shipment"

We pay one cent above Elgin Market for
Butterfat



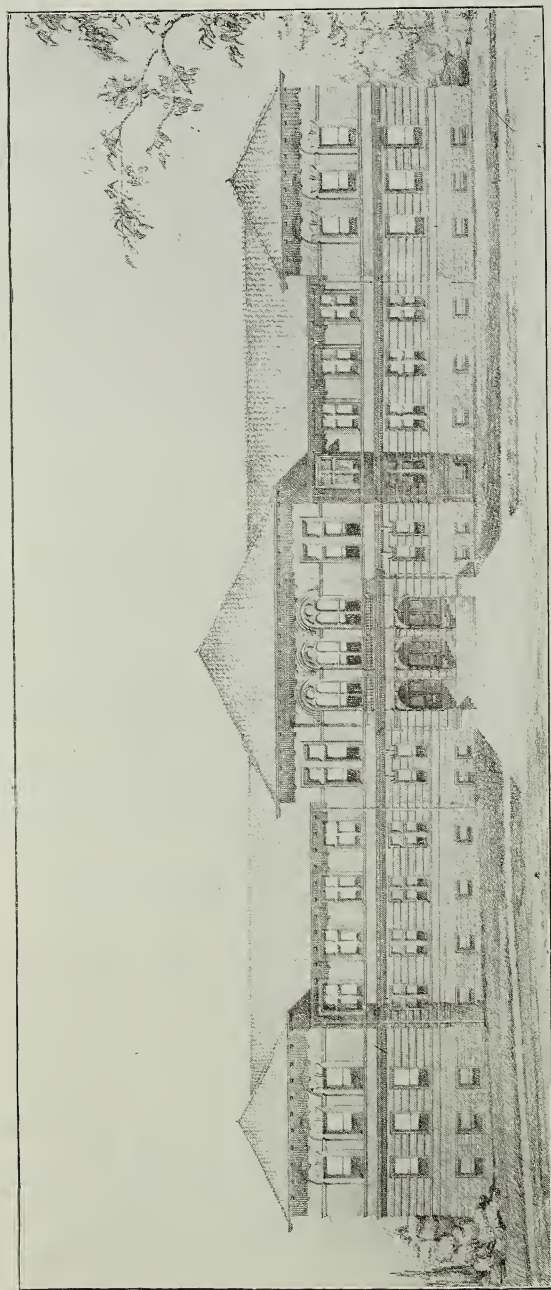
The Ohio Dairy Co.

COLUMBUS, OHIO



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THE NEW HORTICULTURAL BUILDING.

THE AGRICULTURAL STUDENT

Vol. XX.

OHIO STATE UNIVERSITY, COLUMBUS, MARCH, 1914

No. 7

The New Horticultural Building

WENDELL PADDOCK
Professor of Agriculture

ONE can scarcely realize that a building is at last to be provided for the departments of Horticulture and Forestry. Yet the rapidly growing walls on the site of the old Experiment Station building are proof that the long cherished hope of those who are interested in this work is at last about to be realized.

The building, when completed, will resemble Townshend Hall in architecture and in building material, and as its length is 250 feet, it will not fall much short of being as large. But here the comparison ends, as the interior is quite different, and it is to be as nearly up to date in all respects as modern architectural skill can make it.

When completed the structure will be two stories high, with a basement. The entrance is similar to that of Townshend Hall, but inside not so much space is taken up with halls. The rooms are divided nearly equally between the two departments, the Horticultural work being located in the south half.

The offices are located somewhat as in Townshend, the first to be entered being a large general office, where records are to be kept and the general business of the department is to be transacted. The other offices, four in number, extend to the south. The south end is occupied by two class rooms, with seating capacity of 45 each. Across the corridor and facing the west, the remaining space is occupied by a toilet

room, a private laboratory, and a students' reading and study room.

The feature of the second floor is an auditorium with a seating capacity of 400. This room is located in the center and to the west, while across the hall on the east front is a large drafting room. The rest of the space is occupied by a laboratory, two class rooms and a rest room for women.

Perhaps more thought has been given to planning the basement than to the class rooms, as it is here that the special work of the department is conducted. A spray laboratory is to occupy one of the rooms. Arrangements will be made so that each student may make and test spray materials and a commercial cooking plant will also be installed. Power spraying outfits may also be brought into the room for demonstration purposes.

A cold storage room 38 by 35 feet, divided into four compartments, will provide much needed storage space for keeping fruits and vegetables at different temperatures. No one feature of the building will probably add more to the instructional facilities than will this room.

Directly across from the cold storage is a packing room. Here up-to-date facilities for grading and packing fruits will be provided, such as hand and power graders, packing tables, etc.

The south end will be occupied by two rooms, each 26 by 38 feet. The

southeast corner room will be used as a propagating laboratory, where instruction can be given in the various phases of propagation. The southwest room is to be equipped for a canning laboratory. Here will be installed home canning outfits of various types as well as other apparatus needed to illustrate such work.

Then there will be a tool room, a dark room, a janitor's room and a lavatory.

The architects are working on plans for a range of greenhouses to cost \$14,000. These houses are to be ready for use next fall so that the usual winter crops may be grown.

The contractor also promises that the building will be near enough to comple-

tion to be occupied by the opening of the next school year.

When finished the Horticultural plant will be excelled by but few of the colleges of the country and will be better than the majority. It will then remain for us to elaborate our courses so that the instruction in Horticulture may equal the equipment. This means that we must provide complete courses in vegetable growing, in floriculture, in fruit growing, and in landscape architecture.

One can imagine then that great plans are being developed for the future students in Horticulture and we trust that the department may soon earn the respect and good will of all

Insect Pests To Be Watched

EUGENE W. MENDENHALL
Ohio Department of Agriculture

THE Ohio Department of Agriculture, under the Division of Nursery and Orchard Inspection, has begun its regular work of examining foreign shipments of nursery stock. This work is carried on by each state, where shipments of this kind are received.

All foreign shipments of nursery stock are watched by the United States Department of Agriculture, and where states are not provided with an inspection law, the government makes some provision. The American nurserymen use a great deal of stock from Holland, Belgium, England and France, and on account of dangerous insect pests and plant disease which may be transported with the nursery stock, it has become necessary to have some kind of an inspection law to meet this danger. If our government and state had made some provision of this kind long ago, we

would have less trouble with the insect pest and diseases that we are contending with today—such as the San Jose scale, which is destroying our fruit trees every year, and which requires a hard fight to hold them in check.

The San Jose scale first came from China to California, carried there on fruit or nursery stock, and now it has scattered nearly all over the United States and Canada.

Some of the most dreaded insect pests now, and the ones that the government and the states are guarding against very zealously, are the brown-tail moth and the gypsy moth, which can easily be carried on nursery stock from the countries already mentioned. The New England states already have the brown-tail and the gypsy moth to fight, which were imported into Massachusetts in 1868, and have caused enormous dam-

age in the East and has cost annually many thousand of dollars to keep it in check.

The gypsy moth (*Ocneria dispar*), when imported here on nursery stock, is in the egg stage and the larvae hatch early in the spring, according to temperature and location. The caterpillar when full grown is about one and one-half inches in length, of a creamy white, so thickly sprinkled with black that it seems dark brown. From each segment arises tufts of long black and yellowish hair. It changes to a chocolate brown pupa, held in place by fine threads, forms a cocoon and from July to September the moths emerge. The males expand from one and one-half to two inches, and are brownish yellow in color. The females are much larger and more heavily built. They are creamy white in color, with traverse lines, gray

or blackish. They lay their eggs in masses of from four hundred to five hundred, in all conceivable localities and cover them with yellow hair and scale from the end of the abdomen. It has not yet extended west of the New England states. It is perhaps the most dangerous pest ever introduced in the United States, and if not held in check, or if it gets scattered throughout the country, the annual charge upon the farmers would become enormous, if not serious.

Our department examines every foreign shipment very carefully and keeps an exact report of everything that is inspected. If any dangerous insect pest is found, every precaution is used. The stock is all dipped in oil, and the infected stock burned, and the box and packing are also destroyed.



IT PAYS TO SPRAY—ONE MAN SPRAYED 37 NEGLECTED TREES AND SOLD OVER \$500 WORTH OF APPLES THE SAME YEAR.

Orchard Heating

J. WARREN SMITH
Professor of Meteorology

ORCHARD heating is the heating of air in orchards to prevent damage by frost and low temperatures. It has been very successful in the Rocky Mountains and Pacific states and is being taken up by orchardists in Ohio.

Truck growers are also finding it practicable to save their early plants from late frosts, or their late garden crops from early frost damage, by means of fires. Fires may be made of oil, coal, wood or any other material that will burn readily. It has been found that a large number of small fires are far better than a few large ones.

There are some 10 or 15 different types of oil heaters on the market. They vary from one to six gallons capacity and cost from 15c to 50c each. The round heaters of the lard pail type with the top about 7 inches across will burn at the rate of about one quart an hour, when they are first lighted. As the oil burns down in them they will burn more slowly and the heating value will be reduced from 10% to 50%.

The 1-gallon oil heaters should be set at the rate of 60 to 100 per acre. The 3-gallon oil heaters of the oblong type have about three times as much burning surface as the small heaters, so that 30 or 40 to the acre of the larger heaters will probably be sufficient.

If the temperature is falling rapidly lighting should be done when the temperature is 5 or 6 degrees above the danger point, but if it is falling slowly one can wait until it is within 2 or 3 degrees of the dangerous temperature.

Only every third or fourth pot need be lighted at first, and then others

lighted as may be necessary to maintain a safe temperature. The lowest temperature of the night is usually just before sunrise. It will be found that the heating capacity of the oil pots will be reduced as the burning surface is lowered in the heaters. Hence it is desirable to have fresh pots to light late in the night; and there should be too many heaters rather than too few. The fires should be thicker around the outside edge of the orchard, especially on the windward side, and also in low places.

The oil used should be of medium weight, as the light gravity oil burns too rapidly and is too expensive. If the oil is too heavy it does not burn up clean, and there is too much soot.

The initial investment for a 10-acre orchard, including tank, heaters, fuel for one season, etc., will not be far from \$500, or \$50 per acre. After that, under ordinary conditions, the cost will be about \$3 to \$5 per acre per night.

With 100 pots of the 1-gallon capacity burning, 25 gallons of oil per hour will be burned per acre. It is probable that the maximum amount that one would burn in any season would be 4 hours a night for 4 nights even with all of the pots lighted. There would need to be stored therefore 400 gallons of oil per acre. In several instances in Ohio last spring the fuel ran out after the orchard had been successfully heated for two or three nights, so it is better to store an over supply of oil than too little.

With an equipment of oil heaters having a capacity to go through the night without refilling the help required will be about one man for each five

acres. Special gasoline torches are made for lighting the oil heaters. The heaters are set out in the orchards and filled at the beginning of the season and then kept covered to keep the water out.

The coal heaters cost more than the oil heaters, but it does not take so many per acre. The coal burners hold 25 to 30 pounds and will burn from four to six hours. It is considered that one ton of coal is about equal to 100 gallons of oil in heating value. Where 50 coal heaters have been used per acre the

help than either oil or coal. About six sticks of cord wood will last four or five hours. The wood can be lighted quickly by the use of oil and the fires should be started earlier than oil fires. One cord of oak wood has about the same heating capacity as one ton of coal or 100 gallons of oil. The wood fires should be at the rate of 25 to 50 per acre because many small fires of any material are far better than a few large fires.

The local price of the different fuels, as well as the work necessary to use



SHOWING THE DISTRIBUTION OF HEATERS IN THE ORCHARD.

temperature has been raised 10 to 12 degrees.

Oil soaked waste and kindlings should be put into the bottom of the coal heaters before being filled, and then with a torch they may be lighted rapidly. Lighting should be begun earlier than with oil, however, as it takes longer for the heat to begin to be effective.

Cord wood has been used very successfully in orchard heating. The sticks are piled dovetailed together and are pushed together as the ends burn off; for this reason wood requires more

them successfully, must be taken into consideration in determining which fuel to use. Wood has the advantage of needing no equipment of heaters and the disadvantage of more help to handle it.

In small orchards sawdust and shavings can be used. This material can be put into large paper sacks saturated with crude oil. They will burn from six to seven hours, and where these materials are available it is recommended that they be used in connection with other heaters.

In heating effectiveness, one cord of

oak wood equals one ton of coal or 100 gallons of oil.

Temperatures Dangerous to Fruits.

Peaches—When the peach buds are showing pink the dangerous temperature is about 20 degrees. When almost open, 25°; when newly opened, 26°; when petals are beginning to fall, 28°; when petals are all off, 30°; when the shucks or calyx tubes are beginning to fall, that is, just after the fruit has formed, the danger point is 32°.

Apples—When the petals are beginning to show, the danger point is 22°; when in full blossom, 29°; when the petals are dropping and the young fruit is increasing in size, 32°.

Pears—When in bud, 28°; in blossom, 29°; setting fruit, 29°.

Cherries—When in bud, 29°; in blossom and setting fruit, 31°.

Plums—When in bud, 30°; in blossom and setting fruit, 31°.

Experience in Orchard Heating in Ohio.

Cheshire—"On the night of October 21st, 1913, we tried the oil heaters in the tomato field and raised the temperature from 26 to 28 degrees with 25 heaters burning. Later in the night we began to have some trouble and the temperature fell to such an extent that we were unable to raise it in time to keep the tomatoes from freezing. I think the oil heaters are all right when cheap oil can be secured; for southern Ohio I think the coal heaters would be better."

Clyde—"There were not enough heaters to the acre of the size used. There has scarcely been a proper test of oil orchard heating around here yet as we have either run out of oil or have not for some reason used heaters every night when we should have. This year I ran the heaters from about 10 o'clock

until morning during the very cold spell about three weeks before May 10th; and May 10th, when we should have by all means had oil and run the heaters we had none here. My heaters are too small to burn all night.'

Delaware, No. 1—"Thirty fires to the acre were not enough this year; there should be at least fifty. On the upland the temperature was about 30 where the heaters were used. On the black land it was considerably lower than that. I was a little late in lighting my heaters. I should have begun at least one hour earlier. If I had had twice as many heaters I would have saved fully \$10,000.000 worth of apples more. Some of the trees in this orchard showed a good crop on the side of the tree where the heater stood and practically no fruit on the opposite side."

Del Roy—"I did not use heaters but built fires of old rails and coal and find that where I had about three small fires for each tree I saved most of the fruit, but where I had but one fire in the square of four trees I lost all of it even though the fires were large. I fired four nights and the consequence was, the night which was the worst of all, I fell short of fuel just when I needed it most. I did not heat all of the orchard but saved 200 bushels and would not have had any except for the heating. I expect to put 1,000 bushels of coal in the orchard this winter and 100 loads of wood and have plenty of fuel and do the thing right next time."

Frankfort—"We used small wood fires in every other row in the orchard. We saved possibly 2,000 bushels of fruit. In this same orchard heaters were used in the fall at picking time. The temperature was falling rapidly and reached about 22 degrees outside the orchard, but by burning the fires

between the rows the temperature was kept up to about 28 degrees.”

It has been noted that where only a few fires to the acre have been used they have not proved successful in saving the fruit from spring frosts. But where the fires were at the rate of 35 to 50 or more per acre the temperature was from five to ten degrees higher inside the heater area than occurred outside of the orchard. Also that suitable fires can hardly be made from brush and trash.

The use of fires to keep the temperature in the orchard above the danger point during picking as reported at Frankfort is interesting, as well as the experience at Cheshire in protecting tomatoes from early fall frost.

The United States Weather Bureau is establishing a number of special frost stations in Ohio, where a study is being

made of the problems of air drainage and the differences in temperature at different elevations.

One of these stations was in operation at Delaware, Ohio, last spring and it is estimated that the warnings given were at least partly instrumental in the saving of from \$35,000 to \$40,000 worth of fruit in that vicinity. Frost warnings will be telegraphed at Government expense to any section of the State where the fruit or truck interests are large and where action is being taken to protect from frost damage. These warning telegrams are usually sent at about 10 a. m. whenever a frost is expected the coming night.

Correspondence relative to the warnings or the work of orchard or truck protection should be sent to “Local Office, U. S. Weather Bureau, Columbus, Ohio.”

THE GLORY OF THE GARDEN.

Our England is a garden, and such gardens are not made
By singing: “Oh, how beautiful,” and sitting in the shade,
While better men than we go out and start their working lines
At grubbing weeds from gravel-paths with broken dinner knives.
There’s not a pair of legs so thin, there’s not a head so thick,
There’s not a hand so weak and white, nor yet a heart so sick,
But it can find some needful job that’s crying to be done,
For the Glory of the Garden glorifieth everyone.
Oh, Adam was a gardener, and God who made him sees
That half a proper gardener’s work is done upon his knees,
So when your work is finished, you can wash your hands and pray
For the Glory of the Garden that it may never pass away!
And the Glory of the Garden it shall never pass away!

—Rudyard Kipling.

Buds of Our Common Tree Fruit

CLAYTON L. LONG
Assistant in Horticulture

THE bud is a very condensed branch, the undeveloped or embryo state of a branch. It is a more or less dormant organ; that is, the Horticulturist does not recognize the bud until it has attained sufficient size to be obvious. In this state the bud usually represents a resting stage of the plant.

Buds are usually formed in close proximity to leaves, usually in the axis, but under stress of circumstance, adventitious buds may be formed in the cambium without reference to leaves.

The Horticulturist speaks of buds as branch buds and flower buds, according as they give rise to barren, leafy branches, or to flower branches or clusters. True flower buds or fruit buds produce only flowers, as those of the apricot and the peach. Mixed flower buds or fruit buds are those which contain both flower and leaves, as those of the apple and the pear.

On dormant plants, branch buds and flower buds are distinguished by position, shape and size. The position of the flower-bud varies with the plant, but is commonly terminal, either on a branch of normal length or on a very abbreviated branch or spur. The flower bud is commonly larger and thicker than the branch bud because it contains the embryo flower or flowers.

Of all the buds formed, many do not grow, being crowded out in the struggle for existence. These buds often remain alive and dormant for several years, each succeeding year decreasing their chances of growing even if favorable conditions occur.

The Apple.

Of all the common fruit the apple is

the most difficult to distinguish between the branch and the flower buds. Branch buds are borne on twigs and spurs as laterals every year and as terminals every other year. On rapidly growing shoots nothing but branch buds ever occur.

The flower buds occur on twigs and spurs as terminals. As a rule these terminals change from year to year, that is, they produce fruit one year and wood growth the next. It is very easy to determine how much fruit a certain branch has produced by noting the scars and enlargements on the spurs and twigs, for wherever an apple has matured you will find a scar and an enlargement of the twig or spur.

The terminal buds are larger and more uniform than the laterals, the laterals being flattened and more or less oblique. The flower buds are very similar to the terminal branch buds, they are slightly more regular in shape and somewhat longer, but not much larger.

The flower buds contain from five to six embryo leaves as well as five to fifteen flowers.

The Cherry.

The cherry produces buds in a much different way than any of our other fruit. It belongs to that class which produces flower buds one year and blossoms the following. These flower buds may be either on spurs or twigs as laterals. Some varieties of the sour class, however, produce all their flower buds directly on the branches, as there are no fruit spurs.

The sweet cherries, as a class, produce flower buds on spurs and on branches. These buds are found di-

rectly on twigs of last year's growth and on spurs where the shoots are one year or more old.

The flower buds are larger, more plumb and ovate in shape than the terminal or branch buds. They contain from four to five embryo flowers on the sour varieties and from two to five on the sweet varieties.

The Peach.

The flower buds and the branch buds of the peach are both borne directly

common. The single one may be either a flower or a branch bud. These are never more than one branch bud at a node.

There is only one flower in a bud and from about the first of February this bud is quite prominent, being about one-eighth of an inch long and nearly as broad.

Unlike our other fruit trees, the most vigorous buds are found on the lower part of the shoot. It often happens



SOME COMMON FRUIT BUDS.

(a) Pear; (b) Apple; (c) Peach; (d) Cherry; (e) Plum; (f) Apricot.

upon last year's shoots as laterals. They are easily distinguished on account of the greater size and position of the flower buds. On the upper part of the shoot there is usually only one bud at a place, and they are generally flower buds which nearly always die and drop off.

On the lower part of the shoot the buds may be found singly, in twos or in threes. These buds may all be flower buds, or one flower and one branch bud or two flower buds with one branch bud between them which is the most

that some of the branch buds may develop into a branch the same season they are formed.

The Pear.

The buds of the pear are very easily distinguished. The flower buds are larger and more plump than the branch buds. They are borne on the spurs and slower growing shoots as terminal every other year, that is they bear flower buds one year and branch buds the next. These flower buds are not true flower buds, but mixed. They contain not only a cluster of from six to nine

flowers, but also the embryos of five or six leaves. These leaves develop, forming a whorl around the flower cluster.

The larger size and more uniform shape easily distinguish the terminal branch buds from the laterals. The rapidly growing shoots usually bear nothing except branch buds.

The buds of the varieties of pears are just as distinct as the fruit itself, and by a careful study and comparison of the buds alone the varieties can largely be distinguished.

The Plum.

The buds of plum are very similar in shape and appearance, the flower buds being slightly larger and somewhat oval, while the branch buds are

conical. The branch and flower buds on the previous season's growth are very easily distinguished, as the flower buds are borne on the lower portion of the shoot and stand out at a rather prominent angle, while the branch buds are borne on the upper portion of the shoot and lay almost parallel and very close to the shoot.

The greater number of fruit buds are borne on spurs from one to several inches long. Each spur usually bears from two to twenty lateral flower buds and one terminal bud which may be either a flower or branch bud. These spurs are found on wood one year or more old.

The Thinning of Orchard Fruit

LLOYD P. FOSTER, '15

FEW fruit growers in the East practice any regular system of thinning their crops, yet in importance thinning is probably next to spraying. The advantages of thinning may be summed up briefly as follows: First, it produces finer fruits; second, less labor is required for picking and marketing the fruit that has been thinned; third, a more regular, annual bearing habit is encouraged; fourth, the drain on the fertility of the soil is lessened.

First: It is natural to expect that finer fruits will be produced if only one fruit is allowed to grow where two or three grew before, for by reducing the size of a crop on a single tree, the whole energy of the tree is thrown into the fruit that remains, thus producing larger apples, and allowing more sunshine to reach those that remain, which insures better color and quality. In the process of thinning, as far as possi-

ble, those fruits which are mis-shapen, scabby or wormy are discarded.

The second advantage of thinning is that less labor is required in the harvesting of a thinned crop. Although a little additional labor is required in thinning, the greatest amount of work required to pick a heavy crop of small fruit, as compared to the same quantity in which all the fruit is of a larger size, is marked. The smaller fruit means more individual handling in the picking, packing and sorting operations, per box or barrel, and a smaller price received for the same.

Third: A more regular annual bearing habit is encouraged. Fruit spurs bear only every other year, and the whole energy of the tree is required either to form the spur the one year, or to form the fruit the next year. If all the fruit spurs of a tree, then, are allowed to bear in one year, it is ob-

vious that no fruit will be borne the next year. However, by hand picking of one-half the fruit early enough, these fruit spurs will bear the next year. In the case of old trees however, in which the alternate bearing habit has become established, results may not be accomplished the first year or two, but persistent yearly thinning will produce an

essential elements of fertility taken from the soil by a small apple are just as great as those taken by a large apple. This is easy to understand, for invariably a small apple has just as much core and seed as a large apple, and it is the core and seed that contain the important elements taken from the soil. The flesh of a fruit consists mainly of



THINNING IS ONLY SECOND TO PRUNING IN IMPORTANCE.

annual bearing habit in nearly all trees. A few trees, such as the Baldwin, in which the alternate bearing habit has once been established, seem never to respond to such treatment, and the only remedy in such cases is to strip the whole tree of fruit in one year in order that they may bear the next year.

Fourth: The heavy drain on the fertility of the soil is lessened by thinning. It has been found by analysis that the

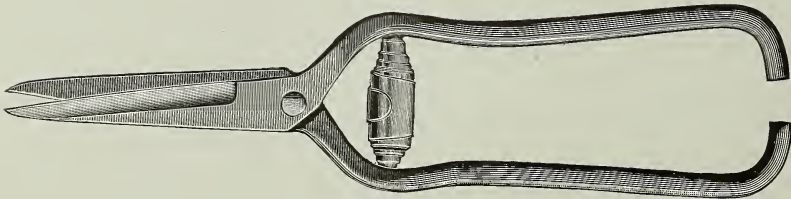
water and starch, neither of which causes a depletion of fertility in the soil. When two fruits can be grown where four grew before, bringing in the same amount of money, the profit is on the side of the two fruits in the amount of plant food that is reserved. So much, then, for the advantages of thinning, and now for the methods of thinning.

There may be said to be three meth-

ods of thinning, any one of which will bring about some of the results of thinning as given above, but a combination of which will bring about the best results. The first method is that of thinning out small branches bearing fruit spurs, in the winter. This winter thinning or pruning also promotes an additional growth of young, fruiting wood. It is not so important where the principal object is thinning as is the second method. The second method is that of thinning or pruning out the small fruit branches in June just after the fruit has set. The result of this operation is three-fold; it not only lessens the amount of fruit borne by the tree that year, but it allows more sunshine to reach the fruit by a reduction of the foliage. It furthermore is a case of summer pruning in that it checks the growth of the tree, causing the tree to give more of its energy to the formation of fruit spurs for the next year. The one disadvantage is that the clusters of fruit are not eliminated, but this can be overcome in the case of very heavy crops by following with hand thinning.

The third method—hand thinning—

is that of picking off individual fruits. In the case of apples and pears a pair of thinning snips is used, as it is quicker than the bare hands and leaves the fruit spur intact. The number of fruits on a branch are reduced by picking off all but a few well placed fruits. Clusters are usually reduced to one or two fruits. The object throughout is to leave every fruit free from the touch of another fruit, thus insuring a perfect shape, to reduce the danger of rot or other diseases, to allow more light and sunshine to each fruit, and to reduce the danger of breaking in the case of otherwise heavily loaded limbs. The amount of thinning all depends upon the kind of fruit and the variety. No set rule can be laid down, but the fruit grower must determine each case by judgment and experience. Peaches are sometimes allowed to remain closer than apples, but are seldom thinned enough. Some apples and plums thin themselves, but seldom enough, and the Jonathan, Grimes, Stayman, and Winesap varieties are almost never thinned enough, and as a result the crop is undersized.



HAND PRUNING SNIPS.

Cellar Storage for Apples

J. B. KEIL
Wooster, Ohio

TO try to find the average cellar, or to state average conditions found in cellars, would be very much like finding the proverbial needle in the haystack—not impossible, but practically so. Therefore, having had the “pleasure” of investigating comparatively few cellars in the course of his career, the writer has come to the conclusion that the best way to handle it is to try to point out the factors which seem to promote the best conditions, and leave the individual who has apples to store determine for himself how nearly he can approximate these conditions.

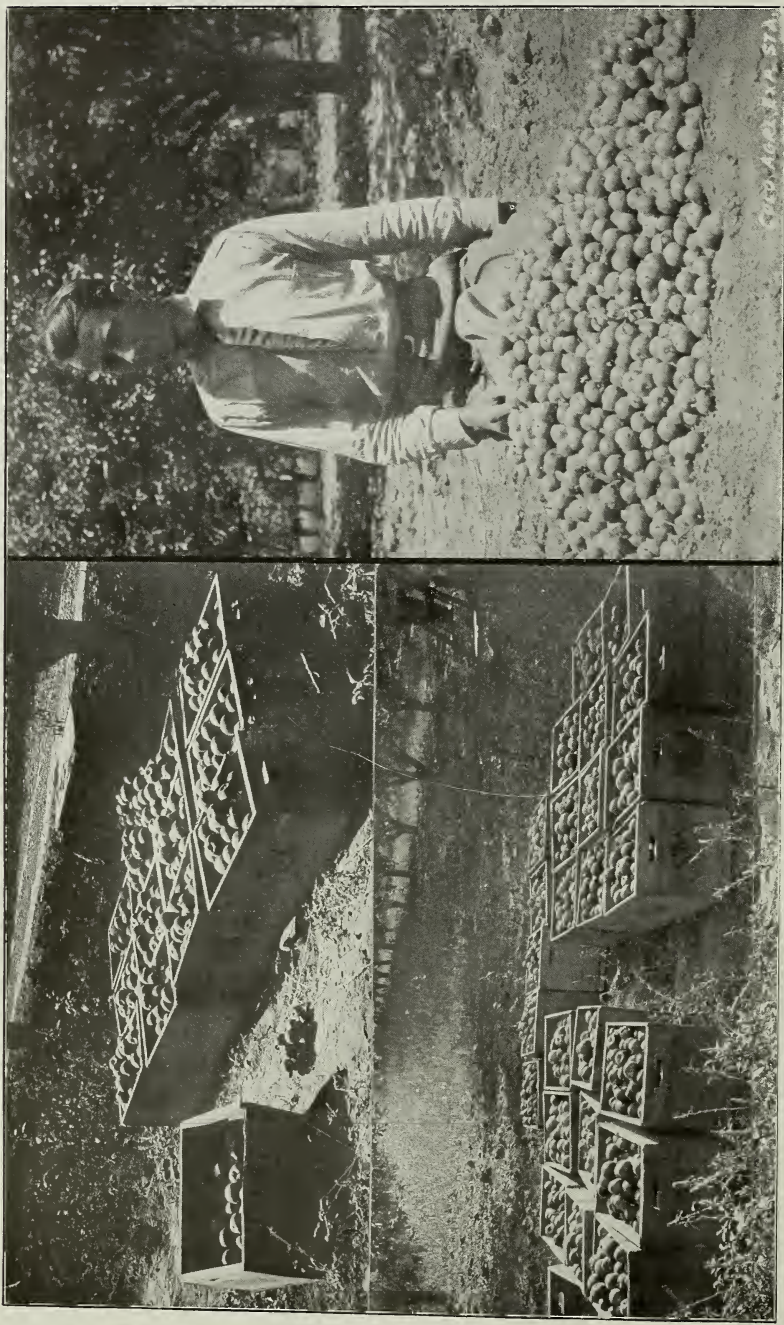
If the apple consumer is also the fortunate individual who produces, he has opportunity to very materially reduce the handicaps attendant upon the process of properly storing the fruit of his trees. The abundance of literature now available bearing upon the care of apple orchards makes a discussion of orchard practice unnecessary in this paper. Sufficient it is to say that the apple-grower who makes use of the means now within his reach, and is not a victim of insurmountable climatic or environmental conditions, should not fail to bring forth a response from the most refractory variety, except it be altogether unsuited to the locality.

Fitting a variety into its most congenial surroundings, both of soil and climate, is an art which has been studied by many horticulturists locally, a few made state-wide observations, and perhaps none have worked over the entire catalog of desirable varieties. However that may be, a knowledge of a number of varieties of apples is a very valuable asset for the apple consumer

who wishes to have his favorite fruit in abundance during as much of the year as his storage facilities permit, or his purse affords.

Granting that the apples have reached the stage of maturity at which they should be taken from the trees, without being attended by any of the apples’ insidious fungus or insect enemies, we may consider the proper time for removal to be when the apple parts readily from the twig without the use of force, or danger of pulling out the stem. The critical stage is reached when sound apples are to be found among the windfalls. Without proper maturity on the tree, the best qualities for the variety cannot be developed, whether complete maturity is attained on the tree or storage is necessary to complete the process.

With picking, the individual responsibility narrows to the care in handling each apple in such a way that no mechanical injuries may develop to offer points of entrance for spores of the Blue Mold, which is the most common apple-storage fungus, and destroys a very large portion of the apples decaying in storage. With regard to the injury resulting from the pulling out of the stem in picking, horticulturists have always, on general principles, insisted that the stem should be retained and that pulling it out resulted in decay. Having had the same opinion, the writer conducted a number of tests with varieties somewhat difficult of picking and consequently with more than ordinary loss of stems, comparing in each case with a similar lot of apples with stems, both samples taken from crates as they came from the orchard.



PROPER THINNING, SPRAYING, FERTILIZATION AND PACKING ARE IMPORTANT FACTORS IN PROFIT-
ABLE APPLE GROWING.

Full confirmation of the generally accepted opinion was expected, but the writer was agreeably disappointed to find that neither constant nor yet considerable difference developed between the sound and stemless apples, though stored under identically the same conditions. Out of 270 sound apples comprising samples of seven varieties, 11.1% decayed during the test from infection starting at the insertion of the stem. Of a similar number of stemless apples (stems pulled out in picking), 11.8% decayed from infection at the point where the stem had been pulled out.

The style of picking receptacle which aids most in careful handling of apples is the one which opens at the bottom and allows the apples to roll out. A fall of even a few inches will often injure an apple, especially if it is of a thin-skinned variety, and if in falling it strikes the projecting stem of another apple, a serious injury is almost certain to result. This principle applies to all other handling—packing, storing, shipping, and retailing. The paper-wrapped apple properly packed in a good bushel box, will usually reach the consumer in the best condition.

Success in keeping apples purchased in bulk from a local grower depends very much on the care used by the grower in picking, grading, and delivering his product. The consumer who obtains his supply of apples in this way can in a measure avoid loss through handling, by immediately regrading the apples and making arrangements to use first the specimens having such injuries as wormholes, stem-punctures, severe bruises, injuries from crate corners, splinters, projecting nails, and sometimes finger nails.

As a container for the apples in the cellar, a ventilated crate, open box, or

bin is desirable. Varieties subject to storage scald (a breaking down of the skin and tissues beneath, indicated by a brown color and softening of the portion affected), among which are: Grimes, Greenville, Fallawater, Wagener, White Pippin, York, etc., are less liable to this trouble when stored in ventilated crates. Bushel crates made of $\frac{1}{2}$ -in. x 2-in. lath are very satisfactory. It should be needless to say that the crates or bins should be clean.

To speak again of the average cellar, the usual condition is the lack of temperature control. Most cellars are too warm rather than too cold. Since private refrigerating plants are within the reach of comparatively few householders we must depend upon outside temperatures for cooling the fruit storage room. A system which allows the warm air to escape from the upper part of the room while the colder air enters to fill the room from below is all that can be desired, provided it is under control, so that freezing is avoided.

The modern heating plant with a furnace in the basement, sometimes separated from the fruit and vegetable room with a partition wall and sometimes not separated, has done much to make the average cellar unsuitable for the storage of apples. The partition and outer walls should be constructed with at least one dead-air space, and two would be much better. Doors should fit tightly and be constructed with an air-space or packed with sawdust or similar material.

If ventilation is to be accomplished through windows, they should be provided with fittings by which they may be set at various positions and the ventilation regulated thereby.

The householder who has apples to store should make it his business to

avail himself of every frosty night of Autumn to get as much of the cold air into his cellar as possible, and in the morning to close the ventilators and retain the lowered temperature. This should be continued until the temperature is constantly below 40 degrees F., and at any time during the winter when it rises above this point. The desirable temperature range is a matter of circumstance. If one wishes to retard the ripening of the apples as much as possible, the nearer to 32 degrees the temperature can be brought without risking too much on possible sudden outside changes, the better this is accomplished. In fact, cold storage at 32 to 34 degrees will so retard ripening with late varieties such as White Pippin, Stark, Collins, Lansingburg, and Fink, that they must be removed from cold storage in order to mature them before the next crop is ready to pick.

At 34 to 38 degrees F. in an ordinary cellar, changes incident to ripening proceed slowly, and the fungi affecting apples in storage also make slow growth. One exception must be made here, and that is the common Blue Mold mentioned above, which is active even at 33 degrees, while Black Rot makes a growth in some cases at these temperatures.

One other point of importance remains to be considered. The humidity of the air in the room as related to the loss of moisture by evaporation from the apples is a point which should not be overlooked. While some varieties are much more subject to wilting or shriveling in a dry atmosphere, very few are proof against this trouble. As a rule those having smooth, glossy, or oily skins are quite free from shriveling, while those having dry, harsh, rough skins, and especially those having russet skins are liable to become

wrinkled and "leathery." The shriveling is probably not caused altogether by loss of moisture, as there is also an evolution of carbon dioxide in the ripening process. Where the plan is practicable, a cistern built in the basement at one side of the fruit and vegetable storage room, with the surface of the water exposed to the air of the room, will prove an excellent equalizer for both temperature and moisture conditions. An impervious or moisture-proof ceiling is desirable to protect the floors above from the moisture-laden air below.

We may sum up the requirements for the proper storage of apples by enumerating the ideal conditions. Sound apples, well colored, properly matured on the trees, free from all insect, fungus, or mechanical injury, placed in clean crates in a frost-proof building or cellar, with a ventilating system under complete control maintaining the temperature at 34 to 38 degrees F., careful attention to the humidity of the air, and the removal and use or sale of the apples when full maturity is reached and before decay sets in because of over-maturity. Such conditions will make possible the keeping of any variety of apple maturing late enough to be classed as a winter apple until it develops its best color and quality.

The choice of varieties for storage and home consumption is a subject which each householder may profitably study. He alone is able to understand the likes and dislikes of the family, and with the varieties now available it should not be difficult to find an assortment which will not only provide good apples according to the tastes of the family, but also enable their enjoyment to be extended over a large part of the year.

Shall We Garden?

L. M. MONTGOMERY
Assistant Professor in Horticulture

WHILE gardening is one of the oldest occupations known to man, it is at the same time one of the least appreciated. Its possibilities as compared with other agricultural pursuits have received slight consideration by the majority of the tillers of the soil.

Nevertheless, whether considered in its more humble aspect of the farm

portant reason for this growth and one which promises well for the future of the industry, is the rapidly decreasing area of tillable new lands subject to development by the homesteader. Census returns indicate that during the last decade the area devoted to cereal crops in the United States increased only 3%, while their value increased 79.8%. During the same period the



A SUITABLE HOUSE FOR GROWING WINTER VEGETABLES.

home garden or in its larger commercial phase, gardening stands as one of the most important economic factors in our nation's wealth production.

The growth of the garden industry has been very rapid during the past decade, both in area and valuation. This may be largely attributed to the fact of the tremendous gain of our urban and consuming population over our rural or producing population. Another im-

acreage devoted to vegetables, other than potatoes, increased 27.8% and in valuation 79.8%. In Ohio during the corresponding period the increase in acreage of vegetables was 19.5% and values 76.8%.

Conservative but thoughtful students of economics tell us that even now, as a nation, we are face to face with the problem of a decreasing per capita food supply.

The inevitable results must be the practice of more intensive cultural methods upon lands now under cultivation. While, no doubt, the practice of better methods will increase the production of our general farm crops, we must expect the greatest increase of food products to come through garden enterprises. Not only does the garden afford the greatest yield of food stuffs, but it also matures them in the shortest space of time. There are few, I believe I may say there are no other, phases of agriculture which mature returns of food products in the short space of time required by gardening.

If this be true as the general status of the vegetable industry, how does Ohio measure up to her possibilities in this regard and what does she offer her sons of toil in the way of an occupation and a competence?

Ohio ranks seventh among the important vegetable producing states,—closely rivalling the great sister state of Illinois, and outstripping her nearest competitor, Pennsylvania by more than a half million dollars of value. Geographically the state is situated in a commanding position as regards the larger markets of the middle west. In fact it seems to be the gateway through which many large cities must draw their supplies of fresh vegetable products.

While we look upon the large markets as the most promising outlet for our food products, the fact remains that there are hundreds of smaller cities in the state which would enrich the purse of numerous up-to-date gardeners and truckers in exchange for fresh products of the soil.

What then is to be the attitude of the young agriculturists toward this promising field and what does it offer him in exchange for his scientific training?

A great deal of merited prejudice

has existed in the minds of many against gardening as a profession because of the prevalence of drudgery and lack of intelligent enterprise among a great proportion of gardeners, who have been transplanted, in many cases, from the serfdom of Europe.

But not so today. Some of our best intelligence and business ability is now occupied in producing the vegetable food supplies of the nation. By co-operation and improved methods of marketing much of the old time drudgery has been eliminated and greater profits have been secured. All of which serves to place the industry upon a higher plane among kindred agricultural occupations. As a matter of fact the close attention to business deemed necessary on the part of the gardener is the only means by which success will be achieved in any line of agriculture. Our better gardeners do not work any harder nor put in any longer hours on the average than their brothers in general agricultural pursuits.

Furthermore, there are few, if any, phases of agriculture where by the expenditure of small amounts of capital one may get as good returns in so short a time as is true of gardening as a whole.

There are sure to be some failures and disappointments, but the general promise is bright and worthy of thoughtful consideration.

Professionally, gardening offers similar advantages to other training. Though it has not been so generally recognized in the curriculum of our agricultural colleges, gardening is now assuming its proper position among the related pursuits.

While the culture of vegetables in general is a relatively simple matter, there are numerous related problems awaiting satisfactory solution by the

more enlightened thought of today. Men are needed as teachers, as demonstrators, as investigators, as experimentors in the several lines of vegetable work which center about market gardening, truck gardening and vegetable forcing. Men are needed to work out problems involving selection and improvement of varieties, breeding of plants for disease resistance, increasing the production of garden crops not only by improved soil and cultural conditions, but by improvement through

propagation from unknown parentage.

The unappeased hunger of a rapidly growing nation requires the products of increasing areas devoted to vegetable crops.

The skilled agricultural artisan needs no better opportunity to earn a competence and sustain the sturdy vigor of rural life.

The plant breeder has no more promising field than this in which to thrust his sickle of fame and fortune.

Marketing

VERNON H. DAVIS

Assistant Professor of Horticulture

THE problems connected with the marketing of the products of the soil are only just beginning to receive the attention their importance deserves. The tendency all too often has been to place the blame for unsatisfactory market conditions upon the general carelessness and ignorance of the average producer and his methods of growing and preparing his products for market. Failing to find this line of argument sufficiently startling to shock the public into the proper state of mental unrest, the middlemen along the line are always available victims to be sacrificed for the pleasure of the multitude.

The various phases of marketing are so hopelessly complex and interdependant, one factor upon another, that any solution of the present problem seems to the writer impossible without the co-operation of all classes concerned.

In connection with the final distribution of farm products there are three classes of people concerned, each rendering a distinct service. One class is concerned primarily with production. Another class has been organized whose business is to distribute these

products to the final consumer who makes up the third class. Each of these classes are absolutely essential to the other, yet the functions of each are absolutely distinct. The present day outcry about eliminating the middleman is largely cheap newspaper notoriety. The consuming public have come to demand a kind of service along with their food supplies that is absolutely impossible for the producer to give except in a very restricted way. The services of a distributing class is absolutely essential to the present day distribution of farm products. It should be remembered that this class as such is dealing in service primarily, not apples or potatoes. The consumer might buy these commodities from the producer direct in many cases, if he had the time and was so inclined, but he wants to buy them in small quantities from day to day and have them delivered almost at any hour of the day or night. The producer cannot give this service except at the neglect of the production side of the triangle, and the consumer has neither the time nor the inclination to go direct to the producer,

hence the necessity for the go-between who gathers together the products of many lands, distributes them to the consumer and adds the price of his service to the price of the commodity.

While this service is essential, the question as to whether it has not become more elaborate than necessary and whether it is, at present, organized upon the most economic basis, is deserving of serious consideration. Investigators along these lines have been all too prone to assume that present day distributing methods, because long established, must be essentially correct and that any relief must come from more scientific methods of farming that would lower the cost of production and finally the price to the consumer.

Finally, the consumer is raising his voice in complaint against the high prices of these products, yet it rarely occurs to him that the quickest way to lower the cost to himself would be to dispense with at least a part of the elaborate service he is now demanding.

A good deal has been said and written about the farmer's 35 cent dollar and the claim is made that this does not represent his fair share of the price received for his products. While this is doubtless true in many cases we must not lose sight of the fact that a large share of the 65 cents has nothing to do with the commodity itself, but stands for service. The question as to the proper amount to be charged to each phase of the problem is, of course, a

pertinent one. The producer discovers that for a bushel of potatoes he sold for 35 cents the fellow who finally ate them paid \$1.00. He immediately assumes that if he could have delivered the potatoes direct to the consumer he would have received the 65 cents that went to the middleman along the line and increased his profits just that much. This plan is often possible and in many cases desirable, but the grower must remember that a distributing charge has been added to his production charge, which reduces his apparent increase in profits very materially.

Another factor largely overlooked by the advocates of direct marketing is that the producer's most serious problem is likely to be that of efficient labor. It is always possible for him to hire an efficient distributor, but not always so easy for him to hire an efficient hired man.

If the labor of distribution is taken on, to the neglect of production this work is often at great loss and production and quality soon suffers with disastrous results. When scientific methods lessen the unit cost of production, better and more direct methods of marketing lessen the cost of distribution and the consumer is willing to dispense with at least a part of the elaborate service he has been insisting upon, then will the final cost of food products be materially lessened to the consumer and all classes concerned receive a fair reward for the service rendered.

A dressed garden is Nature idealized-pastoral scenery put fancifully in man's way. A gardener is a master of what a French writer calls "the charming art of touching up the truth."—John Sedding.

Beautifying the Farmstead

RAY S. DIETZ, '14

NEAT, conveniently arranged buildings and a well kept lawn attractively bordered with trees and shrubs, add greatly to the appearance and value of the home and to the happiness of its occupants. Man should first provide for his necessities, then his comforts and then his pleasures, in beautifying the Farmstead. Professor Davis has truly said, that the nature of our home surroundings plays a vastly greater part in our daily welfare, than most of us realize and appreciate; and we often are judged more seriously by what is seen without than within the house. When there is a negligent and untidy appearance about the home grounds, the younger generation, having a desire for beauty, are unsatisfied with the slovenly appearance of the farm home and are attracted to the cities.

All rational improvement of grounds is founded on a due attention to the character and location of the place to be approved. The former teaches what is advisable; the latter, what is possible to be done. In deciding the character of any place, some attention must be given to its location with respect to other places; to the natural shape of the ground on which the house is built; to the size and style of the house; and even to the rank of its possessor, together with the use which he intends to make of it.

The perfection of landscape gardening consists of the four following requisites: (1) It must display the natural beauties and hide the natural defects of every situation. (2) It must give the appearance of extent and freedom, by carefully disguising or hiding boundary. (3) It must studiously con-

ceal every interference of art, however expensive, by which the scenery is improved, making the whole appear as the production of nature and her methods only. (4) All objects of mere convenience or comfort, if incapable of being made ornamental, or becoming proper parts of the general scenery, must be removed or concealed. To carry out the foregoing, a definite scheme or plan is necessary. So let us discuss the importance and proper treatment of each individual part, bearing in mind that our aim is cleanliness, healthfulness, neatness, convenience, pleasure, dignity, harmony and last beauty.

The house should be located so as to give it the greatest prominence and it should stand out as the center and most conspicuous feature of the picture. It should be back far enough from the main highway to afford privacy and to give a good stretch of lawn in front. Its location should allow good drainage, should be as near the center of the estate as possible, and should receive full benefit of the sun and the fresh air. The outbuildings should be 150 to 200 feet to the rear of the house so situated as to give the best convenience according to their purpose. Don't have too many sheds; just sufficient room to shelter the tools and general equipment. Avoid a promiscuous scattering of machinery about the barnyard, as it always gives a place an air of neglect and detracts from the general appearance. A paddock and buildings of special use or importance may be given prominence without detracting from the beauty or general arrangement of the grounds.

The next step is to connect the individual buildings with a series of walks

and drives. The entrance can be marked by a gateway, and here is the place for the bulletin board, giving the name of the farm, owner, etc. The main drive should enter at the point of heaviest traffic. The walks and drives should lead in the direction the people want to go, bearing in mind the route of the shortest distance and convenient course.

The lawn is not only useful as a covering of the earth, but it is beautiful in itself. A perfect lawn is perhaps one of the rarest possessions of either public or private establishment. A good lawn demands great skill and judgment in its making, as well as in its maintenance.

In grading, a gentle slope away from the house is preferred, in preference to the steep slopes or terraces. The grading should not look mechanical when done, but should directly conform with the surrounding topography.

The requisite in securing a good lawn is to have a good rich, black, loam soil, and if this is lacking it should be supplied as a top dressing, about six inches in depth.

Spring seeding is the most advisable, and the best turf is secured by Kentucky bluegrass. The seed should be sown evenly and thickly at the rate of four bushels per acre. As soon as the grass is tall enough, it should be cut, as this cutting causes the grass to bunch or stool out, but bear in mind that grass should never be cut close.

Nitrate of soda, applied at the beginning of the growing season, and fine stable manure, applied as a mulch at the end of the growing season, are the best fertilizers. For the water supply an underground irrigation or tiling system is preferred, and does not apply the water directly to the plant. There is nothing more beautiful than an open stretch of greensward and it can only

be maintained with the greatest care possible.

Trees should be used as single specimens in isolated places or in irregular groups, avoiding the stiff mechanical arrangement. In general they should be used along the side or in the rear of the picture, to form the frame. Do not plant in front of the house or at a point in which they will obstruct the view. Keep them back far enough from the house to permit a free circulation of air and plenty of sunshine. There is nothing more beautiful or interesting than the play of the shadows on the green lawn.

Shrubbery is correctly used in groups and not scattered around the lawn in a salt and pepper fashion. Plant them in masses about the border in the corners of the porch, along the base of the building, outside the bend in the walk or drive as a reason for its deviation from the general course, and use them to screen some unsightly or unavoidable object displeasing to the eye. Use the taller kinds in the rear and the smaller ones in front, taking care not to use too great an assortment, but enough kinds to give a harmonizing variety of color, both of foliage and blossoms. Plant them two and one-half feet apart. This will allow them to be cultivated and mulched as is necessary.

Flowers are often desirable for ornamental beds. They should be used along the borders or massed in beds at not too prominent a place. Otherwise they will detract from the unity of the picture. Vines are appropriate, especially around porches, or to cover the bare walls of an unsightly building or other structures.

I have only been able to give you a few suggestions, which I hope will create an interest toward the beautifying

of the home grounds, especially your home grounds. I can do no better than to refer you to Nature, where you can study the best lessons of beauty. However we need not be content with Nature's lower levels and our imagination suggests progress and improvement, and these must be used in landscape gardening. Scott has said: "The arts which make life beautiful are those which graft upon the wildings of nature, the refinements and har-

monies, which the Deity through imagination is ever suggesting to us." In the past we have been necessarily concerned with acquiring lands and buildings and we welcome the stage of development which is now reaching the Americans and is causing them to give more attention to the beautifying of their home grounds. Let us make an effort to improve the general condition of our home grounds and add pleasure and dignity to our lives.

A flower garden will grow more good tho'ts, kindly
acts, smiles and pure joy to the inch than the best acre
on the farm.—American Agriculturist.

Apples Under Storage Conditions

J. B. KEIL
Wooster, Ohio

THE tabulation is confined to the varieties commonly considered as winter apples, and the data given are at best only approximate, and apply exclusively to conditions found in cellar storage.

Some explanation of the necessarily brief terms used may aid in understanding the table given below. It is difficult to satisfactorily tabulate information on such variable subjects as varieties of apples, and the terms used are more or less incomprehensive.

Size is given as average size. Color, as that attained when grown under good conditions. As an example of this, Baldwins are often small and poorly colored when grown on old, bushy trees, with little or no pruning or spraying. Flavor includes both aroma and taste,

and the combination of a distinct, pleasing aroma and a moderate degree of acidity constitutes the flavor "rich subacid." Quality is given as a general rating of the apple as compared with others. "Mature in March" means that the variety normally reaches its best condition and flavor in that month. Quality limit is the time after maturity when the process of ripening has gone so far that the fruit becomes undesirable on account of loss of flavor, or becoming mealy or shriveled. Under "Section of Ohio" the section indicated is considered the one where the variety may be expected to attain its best qualities, and is not intended in any sense of the word to be a reflection upon other sections where the variety may be grown.

(See table on next page.)

Variety.	Size.	Color.	Flavor.	Quality.	Mature In.	Quality Limit	Section of Ohio
Arkansas (Mam. B. Twig.)	Large	Red	Rich subacid	Good	March	May	S. & S.-E.
Babbitt	Medium	Red	Sprightly acid	Good	December	March	N. & C.
Bailey's Sweet	Medium	Red	Rich sweet	Very good	November	January	N. & C.
Baldwin	Medium	Red	Rich subacid	Very good	January	April	N. & N.-E.
Banana (Winter)	Large	Blushed	Mild subacid	Very good	December	February	N. & C.
Bellflower (Yellow)	Medium	Yellow	Rich subacid	Good	December	February	N. & C.
Ben Davis	Large	Striped	Mild subacid	Insipid	March	May	S. & C.
Bentley Sweet	Small	Dull red	Mild sweet	Good	April	July	S.-E.
Boiken	Large	Blushed	Subacid	Good	January	March	N. & C.
Collins (Champion)	Medium	Red	Subacid	Fair	March	June	S. & C.
Delicious	Large	Red	Aromatic mild subacid.	Excellent	December	February	C. & S.
Ensee	Large	Red	Mild subacid	Very good	January	April	S. & C.
Fallwater	Very large	Blushed	Mild subacid	Good	December	February	C. & N.
Fameuse (Snow)	Small	Striped	Mild subacid	Good	November	January	N. & C.
Fink	Small	Blushed	Rich subacid	Good	April	July	C. & S.
Grimes' Golden	Medium	Yellow	Rich subacid	Excellent	December	March	N. C. & S.
Hubbardston	Medium	Red	Rich subacid	Very good	December	March	N. & N.-E.
Ingram	Medium	Striped	Mild subacid	Very good	April	July	C. & S.
Jacob's Sweet	Large	Blushed	Rich sweet	Very good	December	March	N. & C.
Jonathan	Medium	Red	Sprightly subacid	Excellent	December	March	N. C. & S.
King of Tompkins Co.	Very large	Red	Rich subacid	Excellent	December	February	N. & N.-E.
Mann	Large	Yellow	Mild subacid	Fair	March	May	C. & S.
Northern Spy	Large	Striped	Rich subacid	Excellent	December	February	N. & N.-E.
Oliver	Medium	Red	Rich subacid	Excellent	December	April	C. & S.
Paradise Sweet	Medium	Blushed	Mild sweet	Good	January	April	N. & C.
Peck's Pleasant	Medium	Blushed	Mild subacid	Very good	January	April	N. & C.
Rail's Janet	Small	Striped	Mild subacid	Very good	February	June	C. & S.
Rambo	Small	Striped	Rich subacid	Excellent	November	January	C. & N.
Red Canada	Medium	Red	Rich subacid	Excellent	December	May	N. & C.
Rhode Island (Greening)	Large	Green	Rich subacid	Excellent	December	February	N. & N.-E.
Rome Beauty	Large	Striped	Mild subacid	Good	January	March	S. & S.-E.
Roxbury (Russet)	Medium	Brown	Rich subacid	Excellent	February	May	C. & S.-E.
Stark	Large	Blushed	Rich subacid	Good	January	May	C. & S.
Stayman Winesap	Medium	Dull red	Rich subacid	Excellent	December	May	S. & C.
Sutton Beauty	Medium	Red	Rich subacid	Excellent	December	March	N. & C.
Tolman Sweet	Medium	Yellow	Rich sweet	Very good	December	March	N. & C.
Wagner	Medium	Blushed	Sprightly subacid	Excellent	December	March	N. & C.
White Pippin	Medium	Light yellow.	Rich subacid	Very good	March	May	N. & C.
Winesap	Small	Red	Rich subacid	Excellent	March	June	S. & S.-E.
York Imperial	Large	Red	Rich subacid	Good	March	May	S. & C.



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COLUMBUS, OHIO, MARCH, 1914.

Editorial

Again we respond to the call of the season and present our Horticultural Number. This is one of the regular issues of The Student that has its own particular month in which to make its annual debut. The other special numbers may shift around from month to month or occasionally be left out entirely, but the call of the orchard is so strong, the business so important and the opportunities in horticulture so vast in Ohio that any number of The Student that does not contain a Horticultural Number is incomplete. Many sources have contributed to the success of this issue. Our worthy contributors have prepared special and timely articles. The Extension Department has been kind in loaning us cuts. Professor Bradford, University Architect, prepared the special drawing of the new Horticultural Building. The Colorado and Iowa Experiment Stations were

kind in loaning cuts. The men in the horticultural department deserve our thanks for the helpful advice they gave us and for the articles they prepared. To our worthy associate, Mr. T. L. Smith, is due most of the credit for the success of this issue. On his shoulders fell the work of collecting the articles and preparing them for publication.

Who has not seen the apple tree resplendent in all its glory at apple blossom time? What artist is there who can paint a picture that will equal the scene to be found on every hillside in May? The deep red of the apple blossom contrasts with the pure white and blends with the pink and all are set off by the deep green of the leaves and harmonize into a beautiful picture that is beyond the ability of any painter to reproduce. Coming out so early in the spring, the apple bloom sets forth the wonderful

THE ORCHARD IN BLOOM.

and matchless glories of nature. Walking through the orchard and imbibing deep draughts of perfume-laden air, looking upon the paintings of nature's artist and listening to the steady hum and buz-z-z of the bees one gets close to **nature and to nature's God**. Out in the orchard alone one can commune with his innermost thoughts, for here all is quietness and beauty wrapped in the essence of solitude. The beautiful shadows play in and out among the trees, the warm sunlight is making all nature burst into bloom—and in apple blossom time all nature is at its best. How well did the Master Architect plan when it was decreed that the beautiful should go along with the useful; when the beautiful flower in all its beauty and perfume should precede the fruit of the harvest; when the artistic accompanies the practical. We can well and truly exclaim, "How wonderful are the ways of nature, her secrets past finding out."

How often do we hear it said that, "Nothing will return greater profits to the farmer than the little time he devotes to the farm orchard." Yet with all the preaching on this subject, with the volumes that have been filled with good advice on handling "The Home Orchard," there is scarcely to be found a sadder sight on most farms than the orchard site. "An apple a day will keep the doctor away" is an old saying that has as much truth as fiction in it. Many apples may be obtained for a little work and the expenditure of some gray matter in thinking out the correct thing to do for the orchard. Why do not our farmers spend a few hours and a little thought on the orchard? Let them prune the trees before the rush of the spring work begins, cultivate the orchard when

it is needed and spray once or twice each spring and—low the erstwhile barren and unproductive orchard will out-do the fondest dreams of the owner. The cost of caring for a farm orchard is really insignificant when compared with the results that may be expected. There is no crop grown in Ohio that will pay as great a return for the time and money spent in fertilizing, mulching, spraying, pruning and cultivating as will the home orchard.

Let our farmers bestir themselves and set in motion a new kind of inertia, for it will be only by so doing that they will give the home orchard a square deal. Practically every farm in Ohio has at least a few berry vines, grape vines or fruit trees. Every farm should and can easily have a few fruit trees with apples for home use the year 'round. The home orchard should be a source of pride on every Ohio farm. Every man who takes a course at Ohio State, every lover of good fruit, should take up the gospel of "**a productive home orchard on every Ohio farm.**"

Almost to the time, "When the memory of man runneth not to the contrary," The Student and **THE NEW BUILDING**, all the loyal friends of Ohio State have been advocating a new Horticultural Building. At last our fondest hopes are to be realized. On the site of the old Experiment Station building we see a beautiful new building fast taking form. Soon our worthy and much deserving horticultural friends will be housed in a modern and well equipped home. Long have they needed such a building and well do they deserve it. Ohio State has one of the strongest horticultural departments in the country. The men are all efficient and well up in their particular lines. They are hard

workers, they know their business and speak with authority when giving advice on some particular phase of their business.

All lovers of the orchard, the garden and the beautiful landscape rejoice with the Horticultural Department on the new home that is fast nearing completion. The horticultural interests of the state are in good hands and when the department is housed in the new building it will not be surpassed by any in the country.

Somewhere in the recesses of our memories there sticks a phrase that crops out now and then. Once upon a time we heard a statement that the men who really do things in this world are seldom seen. How often we fail to realize this. The crowd halloos for the man out in front. He, who can make a grand stand play, receives the cheers, but more often it is true that the real controlling force, the dynamo that generates the power is kept in the rear away from the view of the public.

The Editor has been connected with The Student ever since his freshman days. He has always felt that the man who really financed The Student and who made it possible for it to stand in the foreground of college publications did not receive the credit due him for his efforts. This position requires the keenest business ability coupled with untiring labor and tact to keep the wheels running smoothly. Such a man is our present business manager, Mr. A. J. Henderson, whose untiring efforts have been given freely for The Student and for Ohio State this year. We exempt no one when we say that no one in the agricultural student body has given more freely of his time to the calls from many sources within the College and University than has Mr. Henderson. Much credit is due him for the success of The Student this year. He is a man, who to be fully appreciated, must be known intimately, and when you know him well, you will take off your hat to the prince of business managers and loyal Ohio State men.

There are more opportunities than there are young men to take advantage of them. You say the country has grown larger, that life is more complex and that as a result the personal incentive has vanished in proportion. Everything in that is perfectly correct except the conclusion. The country is bigger and life is more complex, but who will gainsay that if the country has grown bigger and the opportunities have with it, and that if life is more complex, it at least results in a greater variety of opportunities.—James J. Hill.

CURRENT AGRICULTURAL LITERATURE

COMMENTS AND CRITICISMS ON CONTEMPORARY CONTRIBUTIONS

"Solving the Country Church Problem," by **Garland A. Bricker, M. A.**, is a recent book of great interest to those who are striving in the cause of rural betterment. The seventeen chapters deal with the rural church in its many aspects and relationships. Its limitations, opportunities, and possibilities receive attention. The church as a factor in social life, boys' and men's clubs, women's organizations, the rural Sunday school, and the county Y. M. and Y. W. C. A.'s, are other topics discussed. 296 pages. Methodist Book Concern, Cincinnati, Ohio.

Productive Horse Husbandry, by **C. W. Gay, D. V. M., B. S. A.**, is a member of the Lippincott Farm Manual Series. In this book it has been the author's purpose to emphasize industry as applied to horses. With economy and efficiency constantly in mind, he has endeavored to bring the horse into its proper standing in the minds of both student and breeder. The scope of the work is broad, yet comprehensive. The subject content is divided into four main divisions; viz., structure and function; types and breeds; principles of breeding; the horse in service, including feeding, stabling, equitation, hitching, marketing and showing. 331 pages, 173 illustrations. Cloth, \$1.50. J. B. Lippincott Co., Philadelphia, Pa.

Deere & Co., of Moline, Ill., have recently published a book on **Soil Culture**,

by **Dr. W. E. Taylor**. This book is full of information useful to farmers. It treats not only of the soil with its chemical and physical properties, but of a great variety of other subjects; as, the farm cereals and grasses, dairying, drainage, all kinds of live stock, manures, poultry, etc. All the information is condensed and readily found. The price—25 cents for paper covered copies—is within the reach of everyone.

Of perhaps greater interest and value to agricultural students than ordinary motor treatises, is **The Modern Gas Tractor**, by **V. W. Page, M. E.** This book was written mainly as a guide to the farmer and mechanic. It is free from technical language and easily understood. The salient points of construction to be considered before buying, are discussed to enable the prospective buyer to select a motor suitable to his conditions. Special chapters are devoted to the operation, maintenance and repair of motors. The last chapter devotes several pages to practical rules and formulas. 475 pages, over 200 illustrations. Cloth, \$2.00. Norman W Henley Co., New York.

It seems likely that too few farmers realize the economic importance of our birds. **J. R. Cavanagh**, in his article in "**The Breeders' Gazette**" for Feb. 4, on "**The Economic Importance of Birds**," has endeavored to show in what way they influence agriculture. He attrib-

utes the entrance of the boll weevil in the South to have been a direct result of the wholesale slaughter of quail and hawks. Instances of the decided value of birds are given along with the losses caused by the undesirable species.

Prof. C. S. Plumb has written an interesting article for "**The National Stockman and Farmer**" for Feb. 21, on "**The Horse in Italy.**". In it he has given the status of the horse in modern Italy, including the hauling equipment, harness, decorations, etc. The horses seem generally to be overworked, and cruelly treated. Humane societies are just getting started. Draft horses are coming into use in the northern part, as are also some exceptionally good mules.

The growing practice of orchard heating should be of interest to every orchardist. For "**The Country Gentleman**" of Feb. 21, **Calvin Frazer** has written an article on "**The Frost Problem Up-to-Date.**" He has given a brief exposition of the rival theories concerning frost protection, together with the experimental evidence in their connection. A table showing the temperature at which the various fruits, in the different stages, are injured, is given. Other sources of information are suggested on the same subject.

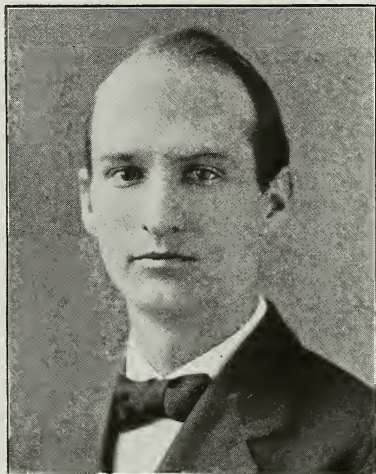
That the American type of farming needs larger areas in contrast to the European type, and that modern machinery with the use of more horses and few men has made the small farm an inefficient unit, are the conclusions of

scientists of the Department of Agriculture, who have recently completed a farm-management survey in the corn belt. A summary of the survey and its results are published in Bulletin No. 41, entitled "**A Farm-Management Survey of Three Representative Areas in Indiana, Illinois and Iowa.**" On rich soil with ample rainfall a system of agriculture is found that is unequaled as an example of the expensive type of farming. This type is developed on the basis of the farm work horse as the means of motive power. Data from about 700 farms in this rich area have been taken as the basis of the new bulletin and the information gathered furnishes almost conclusive proof with respect to many phases of farm organization.

How do you figure the profits of an orchard? **Prof. U. P. Hedrick**, of the New York Experiment Station, wrote an article for "**The American Agriculturist**" for Feb. 28, on "**Outgo and Income of a Ten Acre Orchard,**" in which he endeavored to figure out fairly and accurately what the profits from an orchard are. Perhaps others can be assisted by following this general plan.

O. W. Johnson has written a rather extensive article, based largely on experience, on "**Preparing for the Coming of the Pigs,**" in "**The Breeders' Gazette**" of Feb. 12. Beside the general practices in caring for the sows both before and after farrowing, he has given several suggestions relative to the prevention of the diseases common to young pigs. He emphasizes cleanliness at all times.

ALUMNI WHAT THE BUSY GRADS ARE DOING



Joseph H. Gourley entered the Ohio State University in 1903 and was graduated in 1908, spending five years in the Horticultural Department in the completion of his course. In the spring of 1906 Mr. N. E. Shaw, now nursery and orchard inspector of Ohio, surrendered the position as chief gardener for the Horticultural Department and Mr. Gourley was chosen to take up the work for Mr. Shaw, which he continued for the following two years until his graduation. It was probably in this position that he became especially interested in the science of Horticulture and determined to enter the professional side of the work. The summer of 1908 was spent in the fruit growing regions of the West and in September of the same year he took up his duties as assistant horticulturist at the Ohio Experiment Station in Wooster with Prof. W. J. Green. After two years spent in this position he removed to Columbus

to accept the position of Assistant Professor of Horticulture at Ohio State, being detailed in the Extension Service. Two years later he was appointed Horticulturist at New Hampshire Experiment Station and Professor of Horticulture of New Hampshire State College. These duties he took up the first of September, 1912, which position he holds at the present time. Mr. Gourley was considered one of the best judges of fruit in Ohio, and is sure to be ranked among the leading horticulturists of the country.

N. E. Shaw, '06, is now Chief of the Bureau of Nursery and Orchard Inspection under the Agricultural Commission of Ohio. He has been connected with the inspection work since his graduation. He is also engaged in commercial orcharding in Southern Ohio, having at present 10,000 bearing trees. He is Secretary of the Fruit Growers' Market Company, of Columbus, being associated with **V. H. Davis**, '99, and **E. J. Riggs**, '95. He is also Secretary of the Ohio Apple Growers' Association and of the American Association of Apiary Inspectors.

E. J. Riggs, '95, is Assistant Horticulturist and Field Agent for the Agricultural Experiment Station at Wooster. He has charge of the experimental work over the state and in addition manages his large fruit farm in the southern part of Ohio.

Ira J. Condit, '05, is instructor in Botany and Horticulture in the California Polytechnic School, San Luis Obispo, California.

B. W. Anspen, '10, is Assistant Professor of Horticulture and Horticulturist at the Maryland College Experiment Station.

Herman Clark, '12, is orcharding with the Santa Clara Company, Saratoga, California. This company specializes in the production of fine prunes and apricots.

W. B. Adams, '13, is the manager of a large fruit farm at Frankfort, Ohio. He has been the judge of several fruit shows in that part of the country.

Leo E. Melchers, '13, is Assistant Professor of Plant Pathology and Plant Pathologist at the Kansas Experiment Station.

R. C. Hassler, '13, recently accepted a position with the Cloquet Lumber Co., of Cloquet, Minn.

Don R. Conard, '12, is in the landscape gardening business at New Orleans, La.

H. C. Thompson, '09, is a horticulturist of the Bureau of Plain Industry, Department of Agriculture, Washington, D. C.

G. W. Hood, '10, is at Lincoln, Neb., being Assistant Horticulturist in the College and Experiment Station.

F. W. Rane, '90, is the Horticulturist and Forester at the Massachusetts College of Agriculture.

W. C. Dutton, '12, is the Assistant Horticulturist at the Michigan Agricultural College at Lansing.

B. C. Kirgan, '11, is the orchardist at the Boys' Industrial School at Lancaster, Ohio.

H. C. Hyatt is landscape gardener for the city of Cleveland. He announces the birth of a son on Jan. 1st, 1914.

Paul Barnes, '11, is connected with the Pennsylvania State Board of Agriculture.

Earl Hurst, '09, is a horticulturist at the Ohio Experiment Station.

R. A. Young, '06, is connected with the Bureau of Plant Industry at Washington, D. C.

F. L. James is engaged in commercial orcharding on his farm near Gallipolis.

F. C. Brown, '10, is located on a large fruit farm at Worthington, Ohio.

R. L. Barr, '11, is orcharding near Lancaster, Ohio.

Harry Marsh, '10, was married Jan. 1, 1914, to Miss May March, of Plain City, Ohio. They will live at Amlin, Ohio, where Mr. March is engaged in dairy farming.

Dr. E. M. Allen, who took work in the agricultural college during '04 and '05, was married to Miss Rachel Hart on December 22, 1913. He is a professor in the Physiology Department.

W. M. Bembower, '11, of Ewing Christian College, Allahabad, India, in a recent letter to Prof. Paddock tells of his varied experiences and travels in India. He has made some investigation of horticultural conditions in India and found in one place, which was in the Himalays, fifty miles from a railroad, that it costs fifty cents (one week's work for a man) to deliver a box of fruit to the market. He said Iuetta, Baluchistan, is capable of becoming the California of India in the production of fruit. The secretary to His Highness, the Raja, made a statement to him which represents the condition of many of the educated Indians. He said, "I took my degree in Astronomy, and if I were to go out tonight I could not point out one star that I know. I could tell how many lenses a telescope has and the theory about optics, but nothing practical. It is practical work that the Indians need in their college training." Mr. Bembower expects to return to America about October 1st and take his Master's Degree before again returning to the foreign field.

Secondary Agriculture

Devoted to the Interests of Agricultural Education in High and Common Schools

FRED E. PERRY

With the coming of the spring months the teacher should have some specific plans or details to work out. Perhaps these plans have resulted from winter study or they may have come from agricultural publications. In either case they should be particularly interesting to the community or locality. Perhaps the teacher must determine what course to pursue and how to advance it. In doing this the teacher should aim to gain the confidence of the pupil or class by presenting the subject matter in such a manner as to avoid confusion and partiality. The teacher should have the subject matter well in hand. Ignorance on the part of the teacher is always excusable, but it leaves a definite impression on the mind of the pupil which will tend to cause the lack of interest and confidence on his part. Such a condition must be carefully guarded against.

The ideal condition for such work is in the rural or village school. The community being agricultural and the pupils living on farms, or at least familiar with farm life, the agricultural interest of the community should receive the attention of the school. The real value of such work lies in presenting to the pupils those things which they have looked upon from birth yet have really never comprehended their significance. The pupil is brought into proper relation to his environment; the love for the beautiful is created; the desire for bet-

ter things is stimulated and the importance of simple things is impressed upon his mind. Surely the teacher can not fail to take advantage of such whenever it presents itself.

Now is the time to encourage your pupils to enter the boy's and girls' contests which will be conducted this summer. First of all, provide them with the proper literature on the subject, which can be obtained through the secretary of your county fair association. Find out what other boys have done and use that as a basis for procedure. Write to the Experiment Station at Wooster and find out how to plant, fertilize and care for the acre or plot of the particular contest. All this can be obtained free of charge and given to the pupil. Encourage the parents to give some time to the interest of their children along this line, for without this they may become discouraged. These contests are growing rapidly and the winners are the recipients of much honor.

Are you interested in the consolidation of the school of your township? If you are, sets of lantern slides will be loaned to county superintendents conducting campaigns for consolidation by the Bureau of Education, Department of Interior, Washington, D. C. Express charges and breakage are the only fees paid by those ordering the slides. Investigate the proposition.

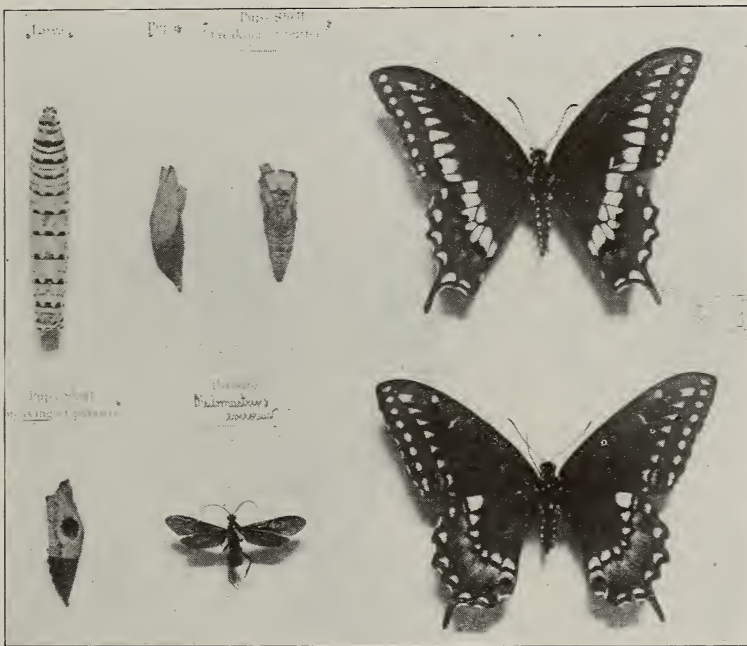
High School Entomology.

Some one has said that this 'is the age of insects.' We are inclined to think that we are living in "the age of man," owing to the ability of man to control everything human, but there is much evidence from a biological standpoint that insects offer a challenge worthy of no little consideration to man with all his attainments.

Diseases of many kinds depend pri-

ued at \$69,000,000, is annually destroyed by other insect pests. It has been estimated by reliable authorities that 10 per cent of the total value of the farm products of the United States, amounting to \$800,000,000, is lost annually—due to the ravages of insect pests.

Domestic animals are affected by various insects, such as the ox warble fly, bot fly, sheep maggot, ticks, etc.; so that the annual loss to live stock



THE LIFE CYCLE OF THE SWALLOW TAIL BUTTERFLY.

marily on the control of insects. Malarial, yellow, and typhoid fever are carried by insects, of which the common house fly is not the least important. We are told by competent authority that more American soldiers were killed by typhoid fever during the Spanish-American war than by Spanish bullets.

In an economic way, insects are of vast importance to the farmer. The cotton-boll weevil destroys \$25,000,000 worth of cotton annually; and in addition 10 per cent of the wheat crop, val-

through insects is estimated at \$175,000,000.

On the other hand, many insects are beneficial and a few contribute directly to the wealth of mankind. Thus the silk worm produces \$200,000,000 of silk annually and the honey bee \$20,000,000 worth of honey per year in the United States alone.

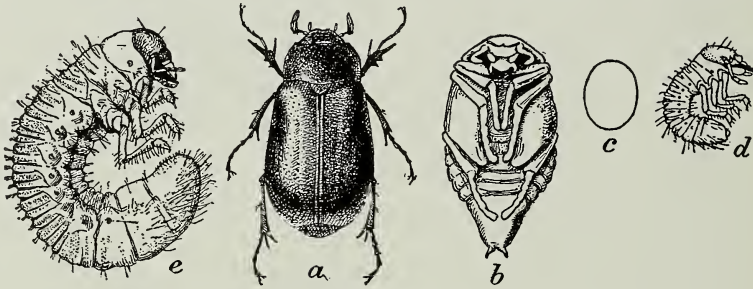
Pollination and the development of flowers depend almost entirely on insects. Many insects live and prey on the bodies of other insects, and, were it

not for these beneficial forms, our common injurious species would become so numerous as to make our existence dubious.

It is evident, then, that the study of insects ought not to be regarded as a trifling matter—so important, indeed, is it that our high schools ought to give more attention to such a study. It is evident, also, that on account of the already crowded curriculums of our high schools, such a study must be limited in some ways. If it is to be given in connection with the agricultural course (and it should be) the time to start would be during the spring months

gather “bugs.” They will take interest in such a project and the “bug” collection will grow from day to day.

The insects should be mounted as soon as possible after their capture. If the specimen is a beetle, the mounting is done by inserting a long pin through the right wing; so that the beetle can be put in a box by inserting the pin point in the bottom of the box. In the case of moths and butterflies, the wings should be spread out their entire length and pressed. Some may be mounted permanently by placing them in a glass covered case on a cotton background. All specimens should be kept in an air-



MAY BEETLE.

(a) Beetle; (b) Pupa; (c) Egg; (d) Newly hatched larva; (e) Full grown larva or white grub.

when insects are plentiful and easily caught. Perhaps it should be taken up as a side line. However, the judgment of the teacher should be used to determine such details. At any event, an insect collection should be made and the pupils would find this a very fascinating study.

In order to do this, provide the pupils with pint milk bottles, tightly corked, in the bottom of which have been placed small wads of cotton saturated with gasoline. When insects have been placed in the bottle, the fumes of the gasoline will kill the insects without causing them to struggle, thus leaving them in good shape for mounting. Allow the pupils to carry the bottles to and from school and encourage them to

tight box. When such a collection has been started, it can be supplemented every year with new forms, and, in the space of several seasons, the collection will furnish a distinctive feature for exhibits aside from its use in the classroom.

The insects of such a collection should have a classification, but it is not advisable to follow the scientific orders. Arrange them, instead, according to their characteristics, such as parasitic, predacious, beneficial, injurious, herbivorous and so forth. The pupils should study the insects from this standpoint and, if a particular pest is found in the neighborhood, make a detailed study of it. Such species as the codling moth, the chinch-bug and the potato beetle

should receive special attention, for they are common forms. Methods of control should be studied and put into practice. Identification can be done by comparison with cuts or figures in an entomology book. If the teacher has had no experience at identification, specimens will be identified free of charge by sending them to the Extension Department of the Ohio State University or to the Experiment Station at Wooster. Bulletins and circulars on insects may be obtained free of charge from each department, also.

The study of the life history, characteristics and adaptation prove very in-

teresting. The wisdom of the ant and the intelligence (if we may call it that) of the honey bee are certainly worthy of observation. Novel ideas attract the attention of the pupil and, while they appear trivial, yet much good can be gotten from them. No class of animals is more fascinating or better rewards the study of the nature lover than insects and their habits. Such a course may lead some one or many to go to college where entomology can be pursued in detail. If, however, this is not the case, a knowledge of insects will be helpful even if it does appear trivial.

C. M. B.

The Aesthetic Versus the Economic in Agriculture.

James F. Walker, '14.

In man's existence upon the earth his most essential need is a means to subsistence. Food, clothing, and shelter must be supplied before mental training, moral training, and refinement of life can be developed. Physical wants must be supplied before the cultural wants can be given attention. A people that find it necessary to devote almost all of their time and energy to providing food for their mouths and clothes for their backs, rarely make much advancement in art, education, religion or in any of those things which tend to lift man to a higher plane of living.

It appears, therefore, that in order to have the best development of society, it is necessary for it to be in a prosperous financial condition. Business conditions must be such as to furnish a money surplus that can be used for the development of the social, intellectual, moral, and spiritual side of life. In addition to money, there must also be

time to devote to these things. A degree of leisure is essential, and no great development has ever been made in a society that did not have time for art, for study, and for thought.

Let us see what application these principles have upon agriculture and agricultural education. In so far as scientific farming contributes to business prosperity it is essential to rural betterment. This fact must be recognized and emphasized, but there is another side to the rural problem besides that of better crops. Along with better crops must come better education, better social conditions, and a power to use an increased income for advancement. Important as is the economic side, it is being overemphasized at the expense of the cultural side. Man does not live by bread alone; and if the finer instincts, and the spiritual side of our existence, are not developed we are missing life's richest blessings. The rural population is in need of education and inspiration, for the development of these finer human instincts. Even in economically prosperous rural popula-

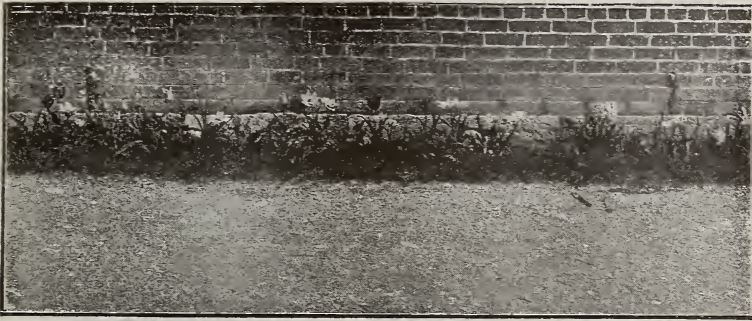
tions we often see a sad lack of appreciation for the things of an aesthetic nature. In our rural districts we do not have as good homes, as good schools, or as good churches as our economic prosperity would justify. One author says, "The condition is not a reflection on the character or public spirit of the farm, as it is largely a result of unavoidable circumstances." This may be true of the past, and even today certain cases of poverty must be admitted; but conservatism, lack of vision, and actual stinginess are often to blame. We need a new perspective, and a higher vision of life.

At this point the opportunity of the rural school must be emphasized. It is through the education of the younger generation that the old order is changed; and the ideals that are impressed upon the children of today, will be the ideals of the next generation. It seems very important, therefore, that the study of agriculture in any of the elementary or secondary schools should not have an overemphasis laid upon the economic side. There is more in agriculture than were dollars and cents, and students should be taught to see that this is true. And how about the money that is earned from agriculture? Is it to be used to buy more land, to grow more corn, to feed more pigs; or is a part of it to be used to build good homes, good roads, good schools, and good churches? The answer to this question will be found in the ideals with which the rising rural generation become enthused. As Kenyon L. Butterfield says, "The child should be shown

the possibility of an intellectual life upon the farm."

The very setting and atmosphere of the rural school should therefore be such as to create an insatiable desire for the higher things of life. Such a love for the beautiful, the artistic, the noble, and the divine, should be formed in the pupils that it will remain a permanent part of their natures. The site of the school building, the school yard, and the building itself, should be suggestive of beauty and high standards of living. The equipment should be adequate and efficient; and the interior furnishings and decorations should be artistic and tasteful. The teacher should be a refined individual with a keen appreciation of life, and a power to lead. Children educated under such environment will form standards of life that will be sure to result in a better community; for the school, the home, and the church are all inter-related, and each has its influence upon the other, and upon society as a whole.

Those interested in the movement for rural betterment need to recognize the stress that is at present being placed upon the economic, materialistic point of view in rural life and in agricultural education, for such stress involves danger. Money making is essential, but should not be so emphasized as to overshadow the higher considerations of life. Culture and adornment are of little use if the power to earn a livelihood is lacking, but the best capacity to make a living is also of little use if it is not coupled with a corresponding power to make life worth while.



March News Notes

Malcolm Sewell, of the Department of Agronomy, has accepted a position in Kansas experimental work at the Garden City sub-station. He is to be the superintendent of irrigation and soils work. He assumed his new duties March 1st. E. S. Porter, a graduate from Mississippi, will have charge of the soils laboratory in the place of Mr. Sewell. J. P. Hershberger and D. W. Griffin are the assistants in the same laboratory this semester.

One hundred fifty-six students in the Winter Course in Agriculture received their certificates February 27. Judge B. F. McCann, of Dayton, one of the trustees of the University, gave the address. The class this year was composed of a few past middle life. Three women took the course. Most of the students are from farms and no doubt will return to till the soil. Eighteen finished the Short Course in Dairying. This means about a dozen and a half good dairy farms in the state.

Great prosperity is expected in Townshend Literary Society the second semester. The meetings have been well attended this year, but more men are wanted in the society. The annual debate with Athenean is scheduled for some time in March. The new officers

for this semester are: President, L. L. Rummell; Vice-President, V. L. Overholt; Secretary, D. P. Evans; Treasurer, R. L. George; Critic, A. J. Bishop; Censor, R. Q. Smith.

The Extension Department has recently published a bulletin on Bees. It was written by E. R. Root, the well-known authority on bees.

Prof. G. A. Bricker, of the College of Education, addressed the February meeting of the Agricultural Society. He is one of the promoters of the Collegiate Country Life Club of America, and desires to start an organization at Ohio State. He proposed that this club be the nucleus of similar clubs among the farmers of the state. The purpose of the Country Life Club is to study rural social and economic problems. It might be possible, he said, for students here to lecture over the state to the subordinate organizations, and thus receive practical training in an almost essential phase of agricultural education. An effort is being made to establish similar organizations in other states to lead in the country life movement.

That the professor works with his pen when he is outside the classroom is seen by the fact that a large number of them

have written text-books, addresses and technical articles for various papers. A biennial bulletin issued by the University shows that in the past two years 73 professors representing 33 departments of the teaching staff have written books or articles. Of this number Dean H. C. Price leads with 56 articles, most of which deal with Rural Credit and agricultural conditions and observations in Europe.

Agricultural scholarships instead of free trips to Washington are recommended by the Department of Agriculture for the winners in the corn, canning and similar contests. These scholarships may be given to include a year's practical training in a college or an agricultural high school. It is thought that such a course would have a more lasting value for the prize winners and their communities than a flying trip to the Capitol. While this is suggested for the state winner, the Department also adds that county winners be given a short course at the State Agricultural College, which lasts but a few weeks in the winter. Counties in other states have done this and find it has proved most valuable to the younger people.

The University architect is working on the specifications for the new block of greenhouses to be erected in the spring. The plans call for twenty-one houses of the most modern construction, suited to the use of students for experimental purposes. Fourteen thousand dollars has been appropriated for this purpose.

At the meetings of the Farmers' Institute of Cumberland, O., on Feb. 19th and 20th, Prof. W. H. Paddock was the principal speaker throughout the sessions.



HORTICULTURAL AND FORESTRY NOTES.

A contest in apple culture has been started in Ohio. The Agricultural Commission, after seeing the results from the corn contest, decided to have a similar contest in orcharding for boys under twenty-one years of age. Ten trees of fall or winter varieties must be selected from a farm orchard which has not been previously sprayed or pruned under the direction of a state department. All spraying, pruning, etc., must be done by the contestant. This work is under the supervision of N. E. Shaw, Chief Inspector of Nurseries and Orchards.

Director Thorne, of the Ohio Agricultural Experiment Station, has stated that Southern Ohio could produce enough apples and other fruit to supply the rest of the United States. He also states that Southern Ohio is best adapted for fruit growing and that fruit of all kinds can be produced the cheapest in that section. If this is true, the Agricultural College can certainly render a service in the way of preparing men that will make possible the development of such a fruit country. Our fondest wishes are being realized in the completion of a fine horticultural building, which will make horticulture and all

its side-lines better than ever. With the co-operation of the Horticultural Department, the College of Agriculture and the Experiment Station, Southern Ohio can truly be made "the garden of Eden of America."

Columbus people are reaping real benefits from the new fruit store, located on South Fourth Street. It is possible to purchase almost any variety of apple desired at "The Sign of the Apple," as the store is called, besides other fruits in season. Every variety of fruit sold is labeled as to its variety and this, together with the attractive hampers used, mark a decided reform in fruit marketing in this city. Much of the fruit sold comes from the orchards of Prof. Davis and E. J. Riggs.

Ohio State was recently honored by a visit from Prof. S. A. Beach, head of the Horticultural Department at Ames, Ia. Prof. Beach has been making an extended tour of the different agricultural colleges located in each state to get data for the construction of the new Horticultural building which is soon to be erected at Ames. In reviewing the plans here and going over the work done by the department, he was very favorably impressed. The Ohio ideas appealed to him as entirely new, and many of the methods used by this department were considered of such extreme value that a decision was made to adopt them in the future at the Iowa College. Prof. Beach even became so enthusiastic as to say that the students of horticulture at Ohio State were doing M. S. work instead of B. S. work.

"Beautifying the Home Grounds" was the topic of an address recently delivered by Prof. Davis before the Glendale Monday Class at Cincinnati. This

organization composed of women is very active in the movement towards the "city beautiful."

The second annual joint meeting of the Columbus Market Gardeners' Association and the Columbus Horticultural Society was held Feb. 25th in Townshend Hall. The session consisted of an all-day meeting from 9 A. M. until 4 P. M., during which time speakers of exceptional ability and national prominence spoke. Director Chas. E. Thorne, of the Ohio Agricultural Experiment Station, spoke upon "The Maintenance of Soil Fertility in Market Garden Lands," laying special stress upon the importance of a balanced ration for garden crops. In her talk upon "Domestic Science," Miss White brought home the truth that it is a good policy to educate the consuming public in the preparation of vegetables in order to increase the demands for these foods. "The Toledo Vegetable and Fruit Growers' Association" was the subject of a talk given by Thos. Crofts, Secretary of the Toledo Association. Prof. Alfred Vivian's lecture on "Gardening in Many Lands," illustrated by lantern slides, on his recent trip around the world, was very gratefully received. The other speaker upon the program, Prof. R. L. Watts, of the Pennsylvania State College, a man known to the gardening world both in a commercial and a professional way, gave two interesting talks, one on "Vegetable Gardening," and one on "The Culture of Special Crops."

The last regular meeting of the Ohio State Horticultural Society was an important one for several reasons. First, because new officers were elected for the coming semester, as follows: President, M. M. Scarff, '14; Vice-President,

A. S. Kiefer, '15; Secretary-Treasurer, Miss Ruth E. La Ganke, '17. Secondly, because steps were taken towards changing the name of the society, because of the confusion arising between this organization and the state organization due to the present similarity of names. Thirdly, because an idea which has long been embryonic concerning the higher perpetuation of the name of Johnny Appleseed became a reality, when a motion was introduced to take up the matter of erecting a statue to him in this state. Most important, however, was the benefit of having Prof. Watts, of the Pennsylvania State College, with the society and hearing his talk upon "The Possibility of Horticulture." Treating this subject in a broad sense, Prof. Watts brought out all the many different kinds of horticultural pursuits there were open to the graduate, and the rewards of each.

The classes in Pomology are carrying on extensive studies with the buds of the pome fruits this month, a phase of Pomology which is becoming more and more important.

The Bureau of Plant Industry is compiling a complete history of the different varieties of fruits and vegetables in this country, their origin and their development. It is the privilege of anyone having an unknown variety of fruit or vegetable to send specimens of it to this office to be identified.

Attention is called to the cut of the pruning snips on page 508. This tool has greatly relieved the tiresome method of hand-thinning, generally practiced throughout our western states until recently. This tool has not yet be-

come established in the eastern orchard sections.

A new custom has been inaugurated by the Ohio State Forestry Society in procuring summer work for students of the Forestry Department. The Society recently appointed a committee to canvass the field and act as an employment bureau. The members of the committee are Ray S. Dietz, J. E. Jones, Geo. Trautman and Prof. Pflueger.

All members of the Forestry Department have been invited to the dedication ceremonies of the new Cornell Forestry building on May 15th. This event will bring together representatives from all parts of the country, men high up in the Forestry world. At least two delegates will be sent from the department here.

News of Forestry work at Ohio State is soon to be published in the Ohio Forester. One purpose of this publication is to encourage literary pursuits among the students of the Forestry College. A separate section will be devoted entirely to student contributions.

The recent death of Moses Craig, '89, has caused a wide felt sorrow among those who knew him here. Mr. Craig was connected with the Department of Horticulture and Forestry at one time, and was also meteorologist for the Ohio Experiment Station before the Station was moved to Wooster. Later he was connected with the Oregon Agricultural College as Professor of Botany, and held a position with the Michigan Agricultural College in a similar capacity. Before his death he was connected with the Shaw Botanical Gardens at St. Louis, Mo.



ANIMAL HUSBANDRY NOTES.

Classes in Animal Husbandry were dismissed on the afternoon of February 26th to attend the sale of Thomas Johnson at Rome, six miles west of Columbus. A large number of the students went out to the farm, where they saw some of the best of Duroc Jersey hogs, both in breeding and quality sold to the various bidders. Seventy gilts and yearling sows were offered at the sale and all brought a good price. The highest price was \$166.

Prof. D. J. Kays attended the public sale of Shepard and Osburn, of Lockbourne, Ohio, early in February. Here he purchased for the Animal Husbandry Department a pure bred Poland China sow. She is a descendant of one of the best strains of the big type of Poland China hogs.

For the instruction of the Winter Course students two high class Percherons were secured for classroom use. These were the fillies that stood first and third in the 1913 Eastern Futurity Show. They are owned by G. A. Dix and O. H. Pollock, respectively. These fillies, with the 1912 Futurity winner owned by the University and a Clydesdale filly, made an exceptionally good ring for the Short Course men to study,

and also afforded them an opportunity to fix in mind the proper type of drafters that they should produce when they return to the farm.

Dr. Paul Fischer has recalled his resignation. In our last issue we stated that he would take up hog cholera work for the Hungarian government and would supervise the serum plant at Reynoldsburg. It is gratifying to note that at this time, when hog cholera is receiving great attention in our state, we shall still have an expert at the front of the fight.

The proposed plan for a coliseum on the state fair grounds did not pass the special session of the legislature because of the large appropriations involved. It was planned to have this building for live stock shows and other features during the state fair. Gov. Cox favored the plan until he saw that measures for economy must be taken to reduce the appropriations on state institutions. It is thought that the coliseum plan will be pushed next year.

"The average production of the dairy cow of Ohio will be raised 300 pounds in the next sixty years," said Prof. Erf, of the Dairy Department, before the Saddle and Sirlain Club. Starting with the importance of the dairy cow in live stock farming today, he continued by saying the time will come when milk will be a by-product of the dairy industry and manure will be the chief product. He scored Dr. C. G. Hopkins' method of reclaiming land with mineral fertilizers alone. He also discussed the breeding of dairy animals with some special reference to some present day champions. At this meeting twelve men, mostly from the Junior and Sophomore classes, were taken into the

club. Each had to prepare a paper on some live stock subject before applying for membership. The election of officers was held and resulted in the following: President, D. W. Williams; Vice-President, M. D. Helser; Secretary, B. E. Pontius; Treasurer, C. J. Windau.

The superintendent of the Advanced Registry of the Holstein-Friesian Association announces a new record in the senior three-year-old class, both in the seven and the thirty-day division. The new champion, Glen Canary De Kol, made a record of 27.7 lbs. of butter fat and 514.5 lbs. of milk in seven days, and 111.9 lbs. of fat and 2,402 lbs. of milk in thirty days. She is owned by E. C. Schroeder, Moorhead, Minn.

A great loss was brought to bear on Elmendorf Farms, of Kentucky, and on the Shorthorn breed by the death of Whitehall Marshall, one of the greatest sons of Whitehall Sultan. This bull was one of the best show bulls of his time and was twice grand champion at the International. He had taken first prize at most of the state fairs of the Middle West and has been a producer of the best show animals.

In the past year there were 1313 cows tested for the Advanced Registry in Ohio. In spite of all these hoodoo numbers, there are now 559 on yearly tests. Besides these, there are many in weekly and monthly tests. Do you see why there are so many record cows in this state?

Under regulations adopted by the Agricultural Commission to enforce the new stallion inspection law, it will be necessary for owners to make application for the examination of stallions. Such applications should have been made by Feb. 15, but the latest date for applications is March 15. After this date it will be unlawful to stand stallions in this state without a license.

An alumnus of Ohio State, Mr. Norman E. Shaw, '06, Chief of Orchard and Nursery Inspection, addressed the Agricultural Society, March 4th. He illustrated with lantern slides "The Chicago Land Show and Ohio's Influence." Ohio's initial exhibit in 1913 was a very creditable one, for it secured the distinction of being the finest ever placed in so small a space. The object of the exhibit was to present a true representation of Ohio with her vast agricultural possibilities and market facilities afforded by railroads, steam boats, and large cities. "No farm in Ohio is more than fifteen miles from a market." Another purpose was to counteract the influence of the Canadian interests which seek to induce farmers to leave the Buckeye State and take up claims in Canada, as a result of a misrepresentation of true conditions in that district.

At the business meeting the election of officers resulted as follows: Editor-in-Chief of The Agricultural Student, L. L. Rummel; Business Manager, F. H. Phillips; President of the Agricultural Society, Virgil L. Overholt; Vice-President, Ira W. Beerbower; Secretary, J. L. Bard.

He who would be wise must daily earn his wisdom.—David Starr Jordan.



ANNOUNCEMENT

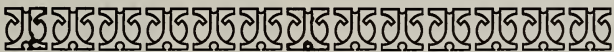
The newly-elected Board is desirous of becoming acquainted with all those men who wish to be on The Student staff next year. If you have any literary tendencies and wish to become better trained in Agricultural Journalism, come over to the office and talk it over with these men at any time.

REMEMBER

A few men cannot put out the best publication that is worthy of the Agricultural College and Ohio State. Your assistance is necessary to keep The Student at the head of the Agricultural College papers. And, furthermore, you are also to be benefited by this work.



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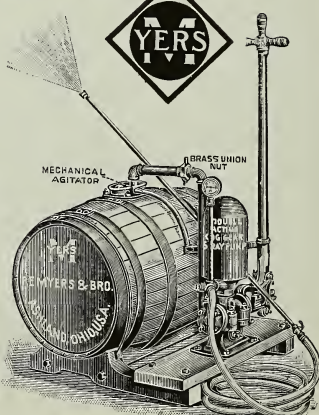
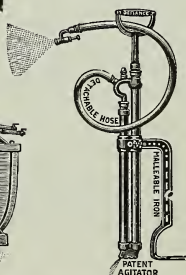
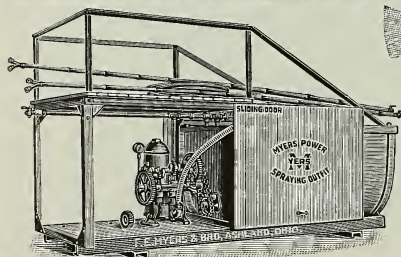
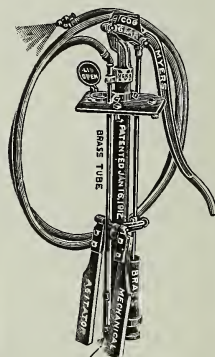
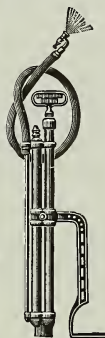
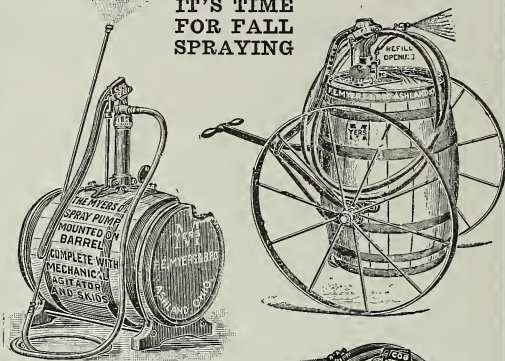
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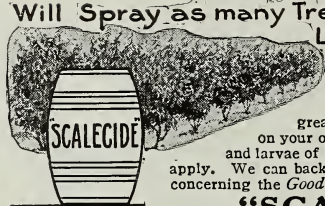
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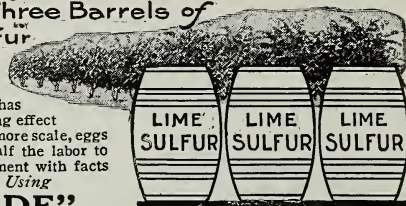
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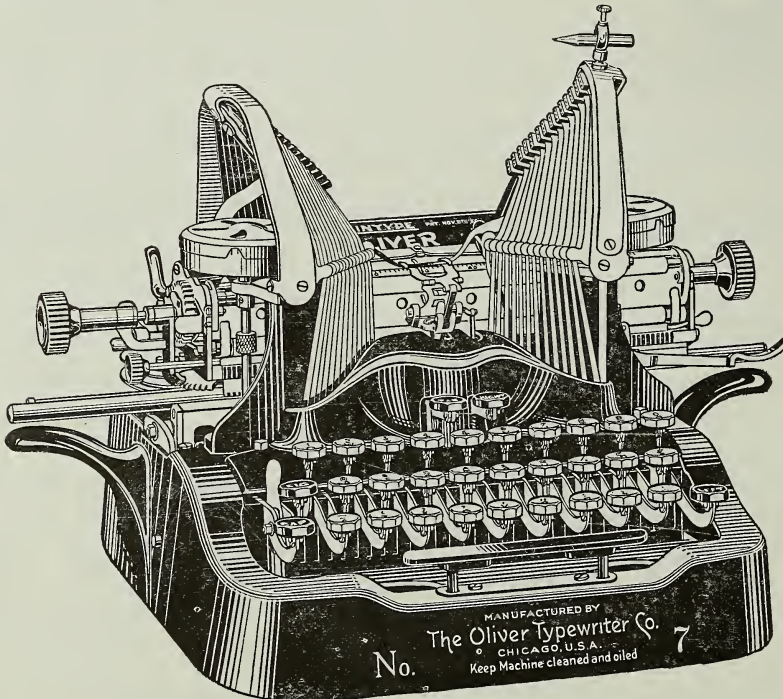
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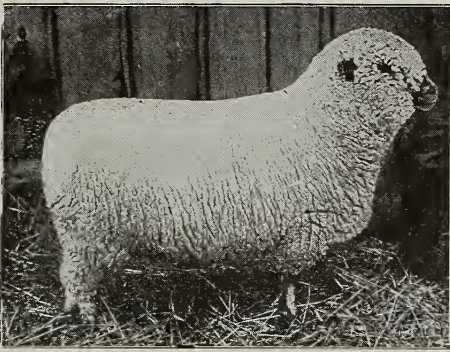
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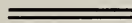
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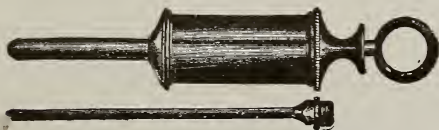


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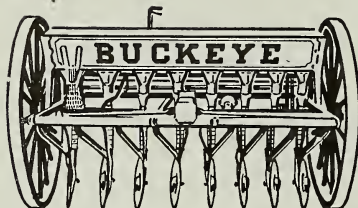
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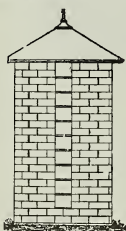
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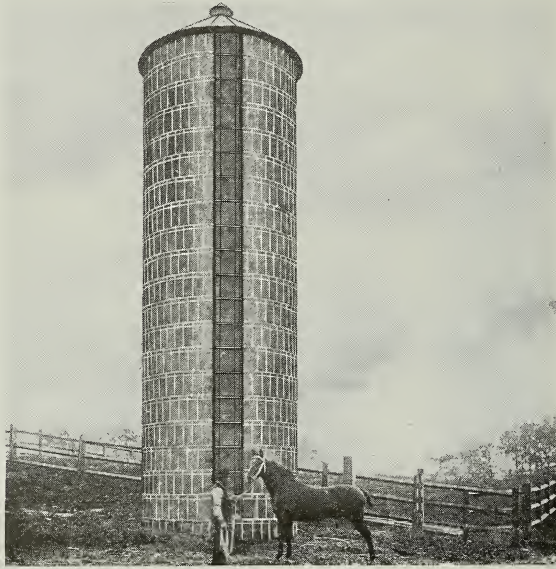
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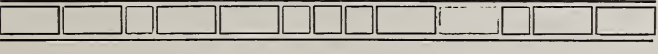
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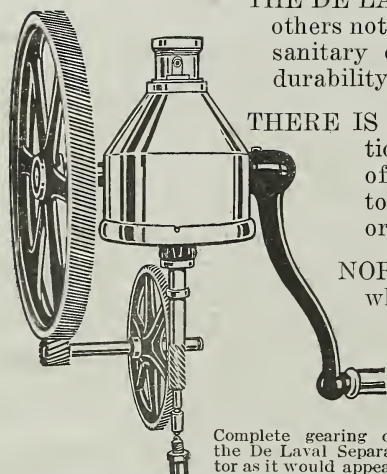
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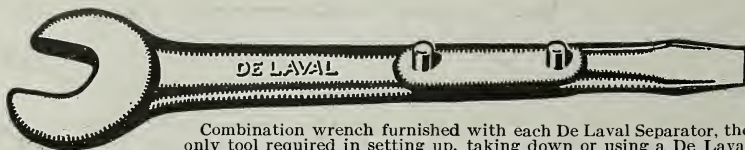
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